JEFFERSON MATH PROJECT REGENTS BY CHAPTER

842 NY Math Regents Exam Questions
Sorted by Prentice Hall Chapter
INTEGRATED ALGEBRA (2008 Edition)

www.jmap.org

Dear Sir

I have to acknolege the reciept of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensible as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

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Lesson 1-1: Using Variables

Part 1: Modeling Relationships with Variables

1. Tara buys two items that cost d dollars each. She gives the cashier $20. Which expression represents the change she should receive?

   [A] $20 + 2d$ [B] $2d - 20$

   [C] $20 - 2d$ [D] $20 - d$

   [1] _____

2. The sum of Scott's age and Greg's age is 33 years. If Greg's age is represented by g, Scott's age is represented by

   [A] $g + 33$ [B] $33 - g$

   [C] $g - 33$ [D] $33g$

   [2] _____

3. Which expression represents "5 less than the product of 7 and x"?

   [A] $7x - 5$ [B] $7(x - 5)$

   [C] $5 - 7x$ [D] $7 + x - 5$

   [3] _____

4. If the number represented by n-3 is an odd integer, which expression represents the next greater odd integer?

   [A] $n + 1$ [B] $n - 2$ [C] $n - 5$ [D] $n - 1$

   [4] _____

5. If $n + 4$ represents an odd integer, the next larger odd integer is represented by

   [A] $n + 5$ [B] $n + 3$

   [C] $n + 6$ [D] $n + 2$

   [5] _____

6. Which expression represents the product of two consecutive odd integers, where n is an odd integer?

   [A] $2n + 1$ [B] $n(n + 2)$

   [C] $n(n + 3)$ [D] $n(n + 1)$

   [6] _____

7. Ashanti and Maria went to the store to buy snacks for their back-to-school party. They bought bags of chips, pretzels, and nachos. They bought three times as many bags of pretzels as bags of chips, and two fewer bags of nachos than bags of pretzels. If x represents the number of bags of chips they bought, express, in terms of x, how many bags of snacks they bought in all.

   [7] _____

8. A store advertises that during its Labor Day sale $15 will be deducted from every purchase over $100. In addition, after the deduction is taken, the store offers an early-bird discount of 20% to any person who makes a purchase before 10 a.m. If Hakeem makes a purchase of x dollars, $x>100$, at 8 a.m., what, in terms of x, is the cost of Hakeem's purchase?

   [A] $0.80x - 12$ [B] $0.85x - 20$

   [C] $0.20x - 3$ [D] $0.20x - 15$

   [8] _____

Lesson 1-2: Exponents and Order of Operations

Part 1: Simplifying and Evaluating Expressions and Formulas

9. If the expression $3-4^2+\frac{6}{2}$ is evaluated, what would be done *last*?

[A] dividing [B] subtracting

[C] squaring [D] adding

[9] _____

10. If $x = 4$ and $y = -2$, the value of $\frac{1}{2}xy^2$ is

[A] 32 [B] 8 [C] -8 [D] -4

[10] _____

11. Brett was given the problem: "Evaluate $2x^2+5$ when $x = 3$." Brett wrote that the answer was 41. Was Brett correct? Explain your answer.

[11] _____

12. If $x = -4$ and $y = 3$, what is the value of $x-3y^2$?

[A] -13 [B] -23 [C] -85 [D] -31

[12] _____

13. If $t = -3$, then $3t^2+5t+6$ equals

[A] -36 [B] 6 [C] -6 [D] 18

[13] _____

14. If $a = 3$ and $b = -1$, what is the value of $ab-b^2$?

[A] 4 [B] -2 [C] -4 [D] 2

[14] _____

15. If n represents an odd number, which computation results in an answer that is an even number?

[A] $2\times n+1$ [B] $2\times n-1$

[C] $3\times n+1$ [D] $3\times n-2$

[15] _____

16. If a and b are both odd integers, which expression must always equal an odd integer?

[A] $a\cdot b$ [B] $\frac{a}{b}$ [C] $a+b$ [D] $a-b$

[16] _____

Part 2: Simplifying and Evaluating Expressions with Grouping Symbols

17. What is the first step in simplifying the expression $(2-3\times4+5)^2$?

[A] add 4 and 5 [B] subtract 3 from 2

[C] multiply 3 by 4 [D] square 5

[17] _____

18. The expression 15 - 3[2 + 6(-3)] simplifies to

[A] -33 [B] -45 [C] 63 [D] 192

[18] _____

19. What is the value of $\frac{x^2-4y}{2}$, if $x = 4$ and $y = -3$?

[A] 2 [B] 14 [C] -2 [D] 10

[19] _____

20. If a is an odd number, b an even number, and c an odd number, which expression will always be equivalent to an odd number?

[A] $ac(b)^1$ [B] $ac(b)^0$

[C] $ac(b)^2$ [D] $a(bc)$

[20] _____

Lesson 1-3: Exploring Real Numbers

Part 1: Classifying Numbers

21. The number 0.14114111411114 . . . is

[A] integral [B] whole

[C] rational [D] irrational

[21] _____

22. Write an irrational number and explain why it is irrational.

[22] _____

23. Which number below is irrational?

$\sqrt{\frac{4}{9}}$, $\sqrt{20}$, $\sqrt{121}$

Why is the number you chose an irrational number?

[23] _____

24. Which number is irrational?

[A] $\sqrt{8}$ [B] $\sqrt{9}$ [C] $\frac{2}{3}$ [D] 0.3333

[24] _____

25. Which expression represents an irrational number?

[A] 0 [B] $\sqrt{2}$ [C] 0.17 [D] $\frac{1}{2}$

[25] _____

26. Which is an irrational number?

[A] $\frac{3}{4}$ [B] $\sqrt{3}$ [C] 3.14 [D] $\sqrt{9}$

[26] _____

27. Which is an irrational number?

[A] $\sqrt{9}$ [B] 0 [C] π [D] $-\frac{1}{3}$

[27] _____

28. Which is an irrational number?

[A] π [B] $0.\overline{3}$ [C] $\sqrt{49}$ [D] $\frac{3}{8}$

[28] _____

29. Given: $\frac{\sqrt{99}}{11}$, $\sqrt{164}$, $\sqrt{196}$

Identify the expression that is a rational number and explain why it is rational.

[29] _____

30. Which number is rational?

[A] $\sqrt{7}$ [B] π [C] $\sqrt{\frac{3}{2}}$ [D] $\frac{5}{4}$

[30] _____

31. Which is a rational number?

[A] $5\sqrt{9}$ [B] $\sqrt{8}$ [C] $6\sqrt{2}$ [D] π

[31] _____

32. Which expression is rational?

[A] $\sqrt{\frac{1}{2}}$ [B] π [C] $\sqrt{3}$ [D] $\sqrt{\frac{1}{4}}$

[32] _____

Part 2: Comparing Numbers

33. Kyoko's mathematics teacher gave her the accompanying cards and asked her to arrange the cards in order from least to greatest. In what order should Kyoko arrange the cards?

[33] _____

34. In which list are the numbers in order from least to greatest?

[A] $\sqrt{3}, \pi, 3.2, 3\frac{1}{3}$ [B] $3.2, 3\frac{1}{3}, \sqrt{3}, \pi$

[C] $3.2, \pi, 3\frac{1}{3}, \sqrt{3}$ [D] $\sqrt{3}, 3.2, \pi, 3\frac{1}{3}$

[34] _____

35. Which numbers are arranged from smallest to largest?

[A] $\sqrt{9.1}, 3.14, \pi, \frac{22}{7}$

[B] $\sqrt{9.1}, 3.14, \frac{22}{7}, \pi$

[C] $\sqrt{9.1}, \pi, 3.14, \frac{22}{7}$

[D] $3.14, \frac{22}{7}, \pi, \sqrt{9.1}$

[35] _____

36. Which list is in order from smallest value to largest value?

[A] $\sqrt{10}, \frac{22}{7}, \pi, 3.1$ [B] $3.1, \frac{22}{7}, \pi, \sqrt{10}$

[C] $3.1, \pi, \frac{22}{7}, \sqrt{10}$ [D] $\pi, \frac{22}{7}, 3.1, \sqrt{10}$

[36] _____

37. Which list shows the numbers $|-0.12|, \sqrt{\frac{1}{82}}, \frac{1}{8}, \frac{1}{9}$ in order from smallest to largest?

[A] $\sqrt{\frac{1}{82}}, \frac{1}{9}, |-0.12|, \frac{1}{8}$

[B] $\sqrt{\frac{1}{82}}, |-0.12|, \frac{1}{9}, \frac{1}{8}$

[C] $\frac{1}{8}, \frac{1}{9}, \sqrt{\frac{1}{82}}, |-0.12|$

[D] $|-0.12|, \frac{1}{8}, \frac{1}{9}, \sqrt{\frac{1}{82}}$

[37] _____

38. Which expression has the *smallest* value?

[A] $-\pi$ [B] $-\sqrt{10}$

[C] $-\frac{16}{5}$ [D] -3.02

[38] _____

39. Which number has the greatest value?

[A] $\frac{\pi}{2}$ [B] $1\frac{2}{3}$ [C] $\sqrt{2}$ [D] 1.5

[39] _____

40. Which inequality is true if $x = \frac{3.04}{1.48}$, $y =$ 1.99 + 0.33, and $z = (1.3)^3$?

[A] $x < z < y$ [B] $x < y < z$

[C] $y < z < x$ [D] $y < x < z$

[40] _____

41. If $t^2 < t < \sqrt{t}$, then t could be

[A] 4 [B] $-\frac{1}{4}$ [C] 0 [D] $\frac{1}{4}$

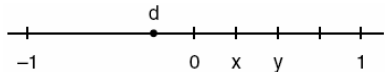
[41] _____

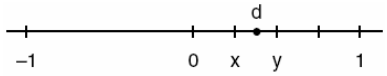
42. If $x^3 < x < \frac{1}{x}$, then x could be equal to

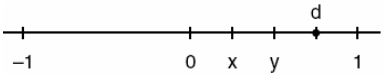
[A] 5 [B] $\frac{6}{5}$ [C] 1 [D] $\frac{1}{5}$

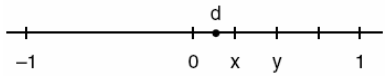
[42] _____

43. Let x and y be numbers such that $0 < x < y < 1$, and let $d = x - y$. Which graph could represent the location of d on the number line?

[A]


[B]


[C]


[D]


[43] _____

44. If $a < b$, $c < d$, and a, b, c, and d are all greater than 0, which expression is always true?

[A] ac < bd [B] a - c + b - d = 0

[C] $\frac{a}{d} > \frac{b}{c}$ [D] a + c > b + d

[44] _____

45. The expression $-|-7|$ is equivalent to

[A] 7 [B] 0 [C] 1 [D] -7

[45] _____

46. If r = 2 and s = -7, what is the value of $|r| - |s|$?

[A] -5 [B] -9 [C] 5 [D] 9

[46] _____

Review P. 24-25: Graphing on the Coordinate Plane

47. The coordinates of A are (-9, 2) and the coordinates of G are (3, 14). What are the coordinates of the midpoint of $\overline{AG}$?

[A] (-6,6) [B] (-6,16)

[C] (-3,8) [D] (-21,-10)

[47] _____

48. M is the midpoint of $\overline{AB}$. If the coordinates of A are (-1,5) and the coordinates of M are (3,3), what are the coordinates of B?

[A] (1,4) [B] (7,1)

[C] (2,8) [D] (-5,7)

[48] _____

49. The midpoint of $\overline{AB}$ is $(-1,5)$ and the coordinates of point A are $(-3,2)$. What are the coordinates of point B?

[A] (1,10) [B] (0,7)

[C] (1,8) [D] (-5,8)

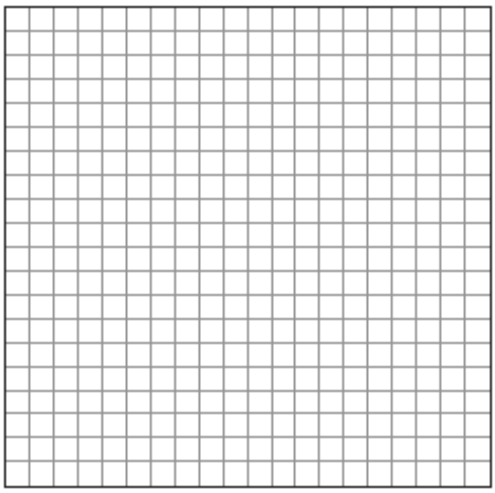
[49] _____

50. A line segment on the coordinate plane has endpoints (2,4) and (4,y). The midpoint of the segment is point (3,7). What is the value of y?

[A] 10 [B] -2 [C] 5 [D] 11

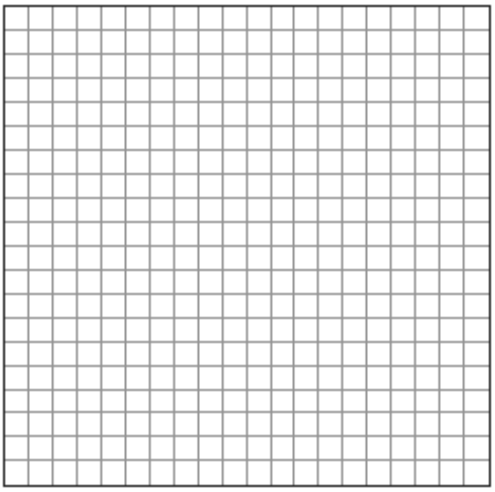
[50] _____

51. The coordinates of the midpoint of $\overline{AB}$ are (2,4), and the coordinates of point B are (3,7). What are the coordinates of point A? [The use of the accompanying grid is optional.]



[51] _____

52. The midpoint M of line segment AB has coordinates (-3,4). If point A is the origin, (0,0), what are the coordinates of point B? [The use of the accompanying grid is optional.]



[52] _____

Lesson 1-4: Patterns and Functions

Part 1: Writing a Function Rule

53. Which linear equation represents the data in the accompanying table?

c	d
0	20.00
1	21.50
2	23.00
3	24.50

[A] $d = 20.00c + 1.50$ [B] $d = 1.50c$

[C] $d = 21.50c$ [D] $d = 1.50c + 20.00$

[53] _____

54. If x and y are defined as indicated by the accompanying table, which equation correctly represents the relationship between x and y?

x	y
2	1
3	3
5	7
7	11

[A] $y = 2x + 3$ [B] $y = x + 2$

[C] $y = 2x + 2$ [D] $y = 2x - 3$

[54] _____

55. Which equation could represent the relationship between the x and y values shown in the accompanying table?

x	y
0	2
1	3
2	6
3	11
4	18

[A] $y = x^2$ [B] $y = x^2 + 2$

[C] $y = 2^x$ [D] $y = x + 2$

[55] _____

Part 2: Relationships in a Function

56. If the value of dependent variable y increases as the value of independent variable x increases, the graph of this relationship could be a

[A] line with a negative slope

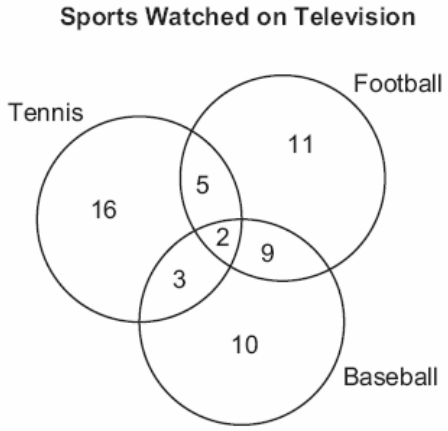
[B] line with a positive slope

[C] vertical line [D] horizontal line

[56] _____

Activity Lab P. 38-39: Interpreting Graphs

57. The accompanying diagram shows the results of a survey asking which sports the members of the Key Club watch on television.



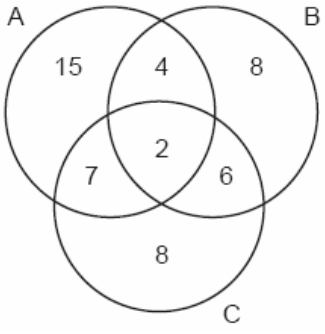
Which statement or statements are true?
I The most watched sport is tennis.
II The least watched sport is baseball.
III More Key Club members watch tennis than football.

[A] II and III, only [B] I and II, only

[C] I, only [D] II, only

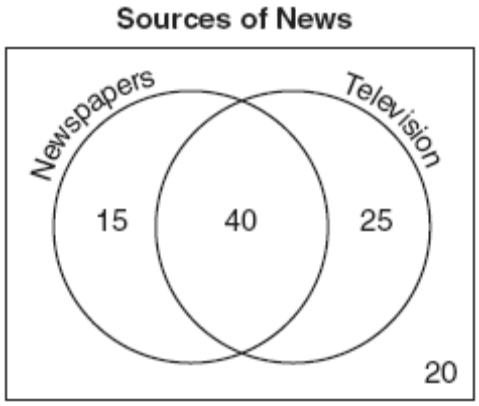
[57] _____

58. The accompanying Venn diagram shows the number of students who take various courses. All students in circle A take mathematics. All in circle B take science. All in circle C take technology. What percentage of the students take mathematics or technology?



[58] _____

59. The accompanying Venn diagram shows the results of a survey asking 100 people if they get news by reading newspapers or by watching television.



What is the probability that a person selected at random from this survey does *not* claim television as a source of getting the news?

[A] $\frac{75}{100}$ [B] $\frac{35}{100}$ [C] $\frac{15}{100}$ [D] $\frac{55}{100}$

[59] _____

60. In a class of 450 students, 300 are taking a mathematics course and 260 are taking a science course. If 140 of these students are taking both courses, how many students are not taking either of these courses?

[A] 140 [B] 110 [C] 30 [D] 40

[60] _____

61. In a class of 50 students, 18 take music, 26 take art, and 2 take both art and music. How many students in the class are not enrolled in either music or art?

[A] 6 [B] 24 [C] 16 [D] 8

[61] _____

62. The senior class at South High School consists of 250 students. Of these students, 130 have brown hair, 160 have brown eyes, and 90 have both brown hair and brown eyes. How many members of the senior class have *neither* brown hair *nor* brown eyes?

[62] _____

63. In a telephone survey of 100 households, 32 households purchased Brand A cereal and 45 purchased Brand B cereal. If 10 households purchased both items, how many of the households surveyed did *not* purchase either Brand A or Brand B cereal?

[63] _____

64. In a survey of 400 teenage shoppers at a large mall, 240 said they shopped at Abernathy's, 210 said they shopped at Bongo Republic, and 90 said they shopped at both stores. How many of the teenage shoppers surveyed did not shop at either store?

[64] _____

65. In Clark Middle School, there are 60 students in seventh grade. If 25 of these students take art only, 18 take music only, and 9 do not take either art or music, how many take both art and music?

[65] _____

66. A car dealer has 22 vehicles on his lot. If 8 of the vehicles are vans and 6 of the vehicles are red, and 10 vehicles are neither vans nor red, how many red vans does he have on his lot?

[66] _____

67. A school district offers hockey and basketball. The result of a survey of 300 students showed:
120 students play hockey, only
90 students play basketball, only
30 students do not participate in either sport
Of those surveyed, how many students play both hockey and basketball?

[67] _____

68. Seventy-eight students participate in one or more of three sports: baseball, tennis, and golf. Four students participate in all three sports; five play both baseball and golf, only; two play both tennis and golf, only; and three play both baseball and tennis, only. If seven students play only tennis and one plays only golf, what is the total number of students who play only baseball?

[A] 60 [B] 44 [C] 56 [D] 12

[68] _____

69. There are 30 students on a school bus. Of these students, 24 either play in the school band or sing in the chorus. Six of the students play in the school band but do not sing in the chorus. Fourteen of the students sing in the chorus and also play in the school band. How many students on the school bus sing in the chorus but do not play in the band?

[69] _____

70. Jose surveyed 20 of his friends to find out what equipment they use to play recorded movies. He found that 12 of his friends have only DVD players, 5 have both DVD players and VCRs, and 2 have neither type of player. The rest of his friends have only VCRs. What is the total number of his friends that have VCRs?

[70] _____

71. In Ms. Wright's English class, 16 students are in band, 7 students play sports, 3 students participate in both activities, and 9 students are not in band and do not play sports. How many students are in Ms. Wright's English class?

[A] 7 [B] 10 [C] 26 [D] 29

[71] _____

Lesson 1-6: Mean, Median, Mode, and Range

Part 1: Finding Mean, Median, and Mode

72. Rosario and Enrique are in the same mathematics class. On the first five tests, Rosario received scores of 78, 77, 64, 86, and 70. Enrique received scores of 90, 61, 79, 73, and 87. How much higher was Enrique's average than Rosario's average?

[A] 15 points [B] 3 points

[C] 2 points [D] 4 points

[72] _____

73. On an English examination, two students received scores of 90, five students received 85, seven students received 75, and one student received 55. The average score on this examination was

[A] 77 [B] 79 [C] 76 [D] 75

[73] _____

74. Seth bought a used car that had been driven 20,000 miles. After he owned the car for 2 years, the total mileage of the car was 49,400. Find the average number of miles he drove *each month* during those 2 years.

[74] _____

75. What was the median high temperature in Middletown during the 7-day period shown in the table below?

Daily High Temperature in Middletown

Day	Temperature (°F)
Sunday	68
Monday	73
Tuesday	73
Wednesday	75
Thursday	69
Friday	67
Saturday	63

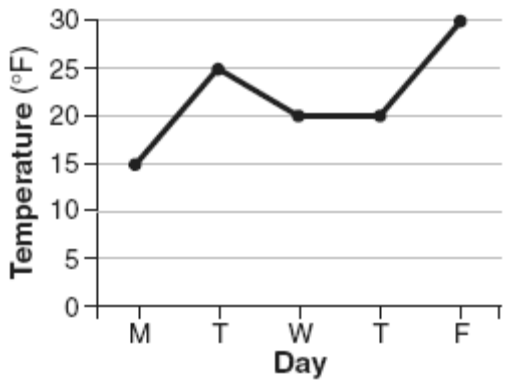
[A] 73 [B] 70 [C] 69 [D] 75

[75] _____

76. Sara's test scores in mathematics were 64, 80, 88, 78, 60, 92, 84, 76, 86, 78, 72, and 90. Determine the mean, the median, and the mode of Sara's test scores.

[76] _____

77. The accompanying graph shows the high temperatures in Elmira, New York, for a 5-day period in January.



Which statement describes the data?

[A] median = mode [B] mean = mode

[C] median = mean [D] mean < mode

[77] _____

78. From January 3 to January 7, Buffalo recorded the following daily high temperatures: 5°, 7°, 6°, 5°, and 7°. Which statement about the temperatures is true?

[A] mean < median [B] mean = median

[C] mean = mode [D] median = mode

[78] _____

79. The ages of five children in a family are 3, 3, 5, 8, and 18. Which statement is true for this group of data?

[A] median > mean [B] median = mode

[C] mean > median [D] mode > mean

[79] _____

80. Melissa's test scores are 75, 83, and 75. Which statement is true about this set of data?

[A] mean < mode [B] mean = median

[C] mode < median [D] mode = median

[80] _____

81. What is the mean of the data in the accompanying table?

Scores (x_i)	Frequency (f_i)
25	3
20	2
11	5
10	4

[A] 16 [B] 15 [C] 14.5 [D] 11

[81] _____

82. The weights of all the students in grade 9 are arranged from least to greatest. Which statistical measure separates the top half of this set of data from the bottom half?

[A] median [B] mean

[C] average [D] mode

[82] _____

83. Two social studies classes took the same current events examination that was scored on the basis of 100 points. Mr. Wong's class had a median score of 78 and a range of 4 points, while Ms. Rizzo's class had a median score of 78 and a range of 22 points. Explain how these classes could have the same median score while having very different ranges.

[83] _____

84. The mean (average) weight of three dogs is 38 pounds. One of the dogs, Sparky, weighs 46 pounds. The other two dogs, Eddie and Sandy, have the same weight. Find Eddie's weight.

[84] _____

85. If 6 and x have the same mean (average) as 2, 4, and 24, what is the value of x?

[A] 14 [B] 36 [C] 10 [D] 5

[85] _____

86. TOP Electronics is a small business with five employees. The mean (average) weekly salary for the five employees is $360. If the weekly salaries of four of the employees are $340, $340, $345, and $425, what is the salary of the fifth employee?

[86] _____

87. During each marking period, there are five tests. If Vanita needs a 65 average to pass this marking period and her first four grades are 60, 72, 55, and 80, what is the *lowest* score she can earn on the last test to have a passing average?

[A] 100 [B] 80 [C] 58 [D] 65

[87] _____

88. The exact average of a set of six test scores is 92. Five of these scores are 90, 98, 96, 94, and 85. What is the other test score?

[A] 86 [B] 89 [C] 91 [D] 92

[88] _____

89. The students in Woodland High School's meteorology class measured the noon temperature every schoolday for a week. Their readings for the first 4 days were Monday, 56°; Tuesday, 72°; Wednesday, 67°; and Thursday, 61°. If the mean (average) temperature for the 5 days was exactly 63°, what was the temperature on Friday?

[89] _____

90. For five algebra examinations, Maria has an average of 88. What must she score on the sixth test to bring her average up to exactly 90?

[A] 92 [B] 100 [C] 94 [D] 98

[90] _____

91. Judy needs a mean (average) score of 86 on four tests to earn a midterm grade of B. If the mean of her scores for the first three tests was 83, what is the *lowest* score on a 100-point scale that she can receive on the fourth test to have a midterm grade of B?

[91] _____

92. In his first three years coaching baseball at High Ridge High School, Coach Batty's team won 7 games the first year, 16 games the second year, and 4 games the third year. How many games does the team need to win in the fourth year so that the coach's average will be 10 wins per year?

[A] 10 [B] 9 [C] 13 [D] 3

[92] _____

93. On the first six tests in her social studies course, Jerelyn's scores were 92, 78, 86, 92, 95, and 91. Determine the median and the mode of her scores. If Jerelyn took a seventh test and raised the mean of her scores exactly 1 point, what was her score on the seventh test?

[93] _____

94. Tamika could not remember her scores from five mathematics tests. She did remember that the mean (average) was exactly 80, the median was 81, and the mode was 88. If all her scores were integers with 100 the highest score possible and 0 the lowest score possible, what was the *lowest* score she could have received on any one test?

[94] _____

95. Angelo, Brandon, and Carl work in the same office. Angelo's age is 4 years more than twice Carl's age. Brandon is 5 years younger than Carl. The average of the three ages is 41. Find the age of each of the men.

[95] _____

Part 2: Stem-and-Leaf Plots

96. The student scores on Mrs. Frederick's mathematics test are shown on the stem-and-leaf plot below.

4	3
6	0 5 5 7 9
7	2 5 6 8 9 9 9
9	0 1 2 5 9

Key: 4 | 3 = 43 points

Find the median of these scores.

[96] _____

97. Jorge made the accompanying stem-and-leaf plot of the weights, in pounds, of each member of the wrestling team he was coaching.

Stem	Leaf
10	9
11	
12	3 8
13	2 4 4 6 8
14	1 3 5 5 9
15	2 3 7 7 9
16	1 3 7 8 8 8 9
17	3 8

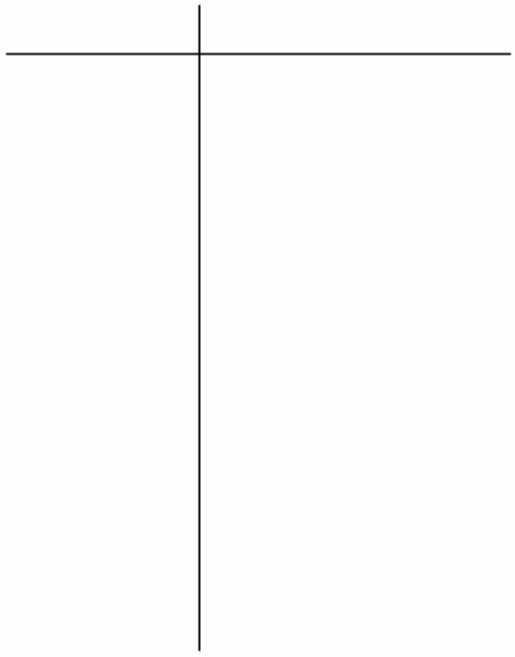
Key: 16 | 1 = 161

What is the mode of the weights?

[A] 150 [B] 145 [C] 152 [D] 168

[97] _____

98. Construct a stem-and-leaf plot listing the scores below in order from lowest to highest.
15, 25, 28, 32, 39, 40, 43, 26, 50, 75, 65, 19, 55, 72, 50



[98]

Lesson 2-2: Subtracting Real Numbers

Part 2: Applying Subtraction

1. On February 18, from 9 a.m. until 2 p.m., the temperature rose from $-14°\,\text{F}$ to $36°\,\text{F}$. What was the total increase in temperature during this time period?

   [A] 50° [B] 32° [C] 22° [D] 36°

   [1] _____

Lesson 2-4: The Distributive Property

Part 2: Simplifying Algebraic Expressions

2. The expression $\frac{5x}{6}+\frac{x}{4}$ is equivalent to

   [A] $\frac{5x}{24}$ [B] $\frac{5x^2}{10}$ [C] $\frac{13x}{12}$ [D] $\frac{3x}{5}$

   [2] _____

3. The expression $2x^2-x^2$ is equivalent to

   [A] 2 [B] x^2 [C] $-2x^4$ [D] x^0

   [3] _____

Lesson 2-5: Properties of Numbers

Part 1: Identifying and Using Properties

4. If a and b are integers, which equation is always true?

   [A] $a+b=b+a$ [B] $\frac{a}{b}=\frac{b}{a}$

   [C] $a+2b=b+2a$ [D] $a-b=b-a$

   [4] _____

5. If M and A represent integers, $M+A=A+M$ is an example of which property?

   [A] associative [B] distributive

   [C] commutative [D] closure

   [5] _____

6. Which expression is an example of the associative property?

   [A] $(x+y)+z=x+(y+z)$

   [B] $x+y+z=z+y+x$

   [C] $x\cdot 1=x$ [D] $x(y+z)=xy+xz$

   [6] _____

7. Which equation illustrates the associative property of addition?

   [A] $3(x + 2) = 3x + 6$

   [B] $x + y = y + x$

   [C] $(3 + x) + y = 3 + (x + y)$

   [D] $3 + x = 0$

   [7] _____

8. The equation $*(\Delta+\Diamond)=*\Delta+*\Diamond$ is an example of the

   [A] associative law [B] distributive law

   [C] commutative law [D] transitive law

   [8] _____

9. Which equation illustrates the distributive property?

   [A] $5(a + b) = 5a + 5b$ [B] $a + 0 = a$

   [C] $a + (b + c) = (a + b) + c$

   [D] $a + b = b + a$

   [9] _____

10. Which equation illustrates the distributive property for real numbers?

[A] $\sqrt{3}+0=\sqrt{3}$

[B] -3(5 + 7) = (-3)(5) + (-3)(7)

[C] $(1.3\times0.07)\times0.63=1.3\times(0.07\times0.63)$

[D] $\frac{1}{3}+\frac{1}{2}=\frac{1}{2}+\frac{1}{3}$

[10] _____

11. Tori computes the value of 8×95 in her head by thinking $8(100-5)=8\times100-8\times5$. Which number property is she using?

[A] closure [B] associative

[C] distributive [D] commutative

[11] _____

12. While solving the equation $4(x+2)=28$, Becca wrote $4x+8=28$. Which property did she use?

[A] distributive [B] identity

[C] associative [D] commutative

[12] _____

13. Which property is illustrated by the equation $\frac{3}{2}x+0=\frac{3}{2}x$?

[A] distributive property

[B] additive inverse property

[C] commutative property of addition

[D] additive identity property

[13] _____

14. Which equation is an illustration of the additive identity property?

[A] $x+0=x$ [B] $x-x=0$

[C] $x\cdot\frac{1}{x}=1$ [D] $x\cdot1=x$

[14] _____

15. Which statement best illustrates the additive identity property?

[A] 6 + 2 = 2 + 6 [B] 6 + 0 = 6

[C] 6 + (-6) = 0 [D] 6(2) = 2(6)

[15] _____

16. Which equation illustrates the multiplicative identity element?

[A] $x\cdot\frac{1}{x}=1$ [B] $x\cdot1=x$

[C] $x+0=x$ [D] $x-x=0$

[16] _____

17. Which expression must be added to $3x$ - 7 to equal 0?

[A] $-3x$ + 7 [B] $-3x$ - 7

[C] 0 [D] $3x$ + 7

[17] _____

18. What is the additive inverse of $\frac{2}{3}$?

[A] $-\frac{2}{3}$ [B] $\frac{3}{2}$ [C] $-\frac{3}{2}$ [D] $\frac{1}{3}$

[18] _____

19. Which property of real numbers is illustrated by the equation $-\sqrt{3}+\sqrt{3}=0$

[A] additive identity

[B] commutative property of addition

[C] associative property of addition

[D] additive inverse

[19] _____

20. If $a \neq 0$ and the sum of x and $\frac{1}{a}$ is 0, then

[A] $x = 1 - a$ [B] $x = -\frac{1}{a}$

[C] $x = -a$ [D] $x = a$

[20] _____

21. What is the multiplicative inverse of $\frac{3}{4}$?

[A] $-\frac{4}{3}$ [B] -1 [C] $\frac{4}{3}$ [D] $-\frac{3}{4}$

[21] _____

22. The multiplicative inverse of $-\frac{1}{3}$ is

[A] $\frac{1}{3}$ [B] -3 [C] 3 [D] $-\frac{1}{3}$

[22] _____

23. Which equation illustrates the multiplicative inverse property?

[A] $-1 \cdot x = -x$ [B] $1 \cdot 0 = 0$

[C] $1 \cdot x = x$ [D] $x \cdot \frac{1}{x} = 1$

[23] _____

24. Ramón said that the set of integers is *not* closed for one of the basic operations (addition, subtraction, multiplication, or division). You want to show Ramón that his statement is correct.
For the operation for which the set of integers is *not* closed, write an example using:
- a positive even integer and a zero
- a positive and a negative even integer
- two negative even integers

Be sure to explain why *each* of your examples illustrates that the set of integers is *not* closed for that operation.

[24] _____

25. Which set is closed under division?

[A] integers [B] {1}

[C] whole numbers [D] counting numbers

[25] _____

26. An addition table for a subset of real numbers is shown below. Which number is the identity element? Explain your answer.

+	0	1	2	3
0	0	1	2	3
1	1	2	3	4
2	2	3	4	0
3	3	4	0	1

[26] _____

27. The operation element @ is determined by the following table:

@	a	b	c
a	a	b	c
b	b	c	a
c	c	a	b

What is the identity element of this operation?

[A] *b*, only [B] *a*, only

[C] *a* and *b* [D] *c*

[27] _____

28. What is the identity element for ♣ in the accompanying table?

♣	*r*	*s*	*t*	*u*
r	*t*	*r*	*u*	*s*
s	*r*	*s*	*t*	*u*
t	*u*	*t*	*s*	*r*
u	*s*	*u*	*r*	*t*

[A] *u* [B] *s* [C] *t* [D] *r*

[28] _____

29. In the addition table for a subset of real numbers shown below, which number is the inverse of 3? Explain your answer.

⊕	1	2	3	4
1	2	3	4	1
2	3	4	1	2
3	4	1	2	3
4	1	2	3	4

[29] _____

30. The operation * for the set {*p*,*r*,*s*,*v*} is defined in the accompanying table. What is the inverse element of *r* under the operation *?

*	p	r	s	v
p	s	v	p	r
r	v	p	r	s
s	p	r	s	v
v	r	s	v	p

[A] *r* [B] *p* [C] *s* [D] *v*

[30] _____

Lesson 2-6: Theoretical and Experimental Probability

Part 1: Theoretical Probability

31. Which inequality represents the probability, *x*, of any event happening?

[A] $x \geq 0$ [B] $0 \leq x \leq 1$

[C] $x < 1$ [D] $0 < x < 1$

[31] _____

32. A fair coin is thrown in the air four times. If the coin lands with the head up on the first three tosses, what is the probability that the coin will land with the head up on the fourth toss?

[A] 0 [B] $\frac{1}{2}$ [C] $\frac{1}{16}$ [D] $\frac{1}{8}$

[32] _____

33. A fair coin is tossed three times. What is the probability that the coin will land tails up on the second toss?

[A] $\frac{2}{3}$ [B] $\frac{1}{2}$ [C] $\frac{1}{3}$ [D] $\frac{3}{4}$

[33] _____

34. When a fair coin was tossed ten times, it landed heads up the first seven times. What is the probability that on the eighth toss the coin will land with tails up?

[A] $\frac{1}{2}$ [B] $\frac{3}{7}$ [C] $\frac{7}{10}$ [D] $\frac{3}{10}$

[34] _____

35. Seth tossed a fair coin five times and got five heads. The probability that the next toss will be a tail is

[A] $\frac{5}{6}$ [B] $\frac{1}{6}$ [C] $\frac{1}{2}$ [D] 0

[35] _____

36. Mary chooses an integer at random from 1 to 6. What is the probability that the integer she chooses is a prime number?

[A] $\frac{4}{6}$ [B] $\frac{5}{6}$ [C] $\frac{3}{6}$ [D] $\frac{2}{6}$

[36] _____

37. A box contains six black balls and four white balls. What is the probability of selecting a black ball at random from the box?

[A] $\frac{6}{10}$ [B] $\frac{1}{10}$ [C] $\frac{4}{6}$ [D] $\frac{6}{4}$

[37] _____

38. A six-sided number cube has faces with the numbers 1 through 6 marked on it. What is the probability that a number less than 3 will occur on one toss of the number cube?

[A] $\frac{4}{6}$ [B] $\frac{3}{6}$ [C] $\frac{2}{6}$ [D] $\frac{1}{6}$

[38] _____

39. The faces of a cube are numbered from 1 to 6. What is the probability of *not* rolling a 5 on a single toss of this cube?

[A] $\frac{4}{5}$ [B] $\frac{1}{5}$ [C] $\frac{5}{6}$ [D] $\frac{1}{6}$

[39] _____

40. If the probability that it will rain on Thursday is $\frac{5}{6}$, what is the probability that it will *not* rain on Thursday?

[A] 0 [B] $\frac{1}{6}$ [C] 1 [D] $\frac{5}{6}$

[40] _____

41. The party registration of the voters in Jonesville is shown in the table below.

Registered Voters in Jonesville	
Party Registration	**Number of Voters Registered**
Democrat	6,000
Republican	5,300
Independent	3,700

If one of the registered Jonesville voters is selected at random, what is the probability that the person selected is *not* a Democrat?

[A] 0.400 [B] 0.667

[C] 0.600 [D] 0.333

[41] _____

42. If Laquisha can enter school by any one of three doors and the school has two staircases to the second floor, in how many different ways can Laquisha reach a room on the second floor? Justify your answer by drawing a tree diagram or listing a sample space.

[42] _____

43. The Grimaldis have three children born in different years.
a Draw a tree diagram or list a sample space to show all the possible arrangements of boy and girl children in the Grimaldi family.
b Using your information from part *a*, what is the probability that the Grimaldis have three boys?

[43] _____

44. Kimberly has three pair of pants: one black, one red, and one tan. She also has four shirts: one pink, one white, one yellow, and one green.
Draw a tree diagram or list the sample space showing all possible outfits that she could wear, if an outfit consists of one pair of pants and one shirt.
How many different outfits can Kimberly wear?

[44] _____

Lesson 2-7: Probability of Compound Events

Part 1: Finding the Probability of Independent Events

45. Selena and Tracey play on a softball team. Selena has 8 hits out of 20 times at bat, and Tracey has 6 hits out of 16 times at bat. Based on their past performance, what is the probability that both girls will get a hit next time at bat?

[A] $\frac{31}{40}$ [B] $\frac{48}{320}$ [C] 1 [D] $\frac{14}{36}$

[45] _____

46. The probability that the Cubs win their first game is $\frac{1}{3}$. The probability that the Cubs win their second game is $\frac{3}{7}$. What is the probability that the Cubs win both games?

[A] $\frac{2}{5}$ [B] $\frac{1}{7}$ [C] $\frac{6}{7}$ [D] $\frac{16}{21}$

[46] _____

Part 2: Finding the Probability of Dependent Events

47. Bob and Laquisha have volunteered to serve on the Junior Prom Committee. The names of twenty volunteers, including Bob and Laquisha, are put into a bowl. If two names are randomly drawn from the bowl without replacement, what is the probability that Bob's name will be drawn first and Laquisha's name will be drawn second?

[A] $\frac{1}{20} \cdot \frac{1}{19}$ [B] $\frac{1}{20} \cdot \frac{1}{20}$

[C] $\frac{2}{20!}$ [D] $\frac{2}{20}$

[47] _____

48. A student council has seven officers, of which five are girls and two are boys. If two officers are chosen at random to attend a meeting with the principal, what is the probability that the first officer chosen is a girl and the second is a boy?

[A] $\frac{10}{42}$ [B] $\frac{7}{13}$ [C] $\frac{2}{7}$ [D] $\frac{7}{14}$

[48] _____

49. There are four students, all of different heights, who are to be randomly arranged in a line. What is the probability that the tallest student will be first in line and the shortest student will be last in line?

[49] _____

50. Mr. Yee has 10 boys and 15 girls in his mathematics class. If he chooses two students at random to work on the blackboard, what is the probability that both students chosen are girls?

[50] _____

Lesson 3-1: Solving Two-Step Equations

Part 1: Solving Two-Step Equations

1. Solve for x: $\frac{1}{16}x+\frac{1}{4}=\frac{1}{2}$

[1] _____

2. If $2x + 5 = -25$ and $-3m - 6 = 48$, what is the product of x and m?

[A] 270 [B] 3 [C] -270 [D] -33

[2] _____

3. If $-2x+3=7$ and $3x+1=5+y$, the value of y is

[A] 0 [B] 10 [C] 1 [D] -10

[3] _____

4. How many times larger than $\frac{1}{4}x$ is $5x$?

[A] $\frac{5}{4}$ [B] 20 [C] $\frac{4}{5}$ [D] 9

[4] _____

5. At the beginning of her mathematics class, Mrs. Reno gives a warm-up problem. She says, "I am thinking of a number such that 6 less than the product of 7 and this number is 85." Which number is she thinking of?

[A] 637 [B] 13 [C] 84 [D] $11\frac{2}{7}$

[5] _____

6. Every month, Omar buys pizzas to serve at a party for his friends. In May, he bought three more than twice the number of pizzas he bought in April. If Omar bought 15 pizzas in May, how many pizzas did he buy in April?

[6] _____

7. Mr. Perez owns a sneaker store. He bought 350 pairs of basketball sneakers and 150 pairs of soccer sneakers from the manufacturers for $62,500. He sold all the sneakers and made a 25% profit. If he sold the soccer sneakers for $130 per pair, how much did he charge for one pair of basketball sneakers?

[7] _____

Lesson 3-2: Solving Multi-Step Equations

Part 1: Using the Distributive Property to Combine Like Terms

8. What is the solution of the equation $3y-5y+10=36$?

[A] -13 [B] 2 [C] 4.5 [D] 13

[8] _____

9. Sara's telephone service costs $21 per month plus $0.25 for each local call, and long-distance calls are extra. Last month, Sara's bill was $36.64, and it included $6.14 in long-distance charges. How many local calls did she make?

[9] _____

10. What is the value of x in the equation $\frac{x}{2}+\frac{x}{6}=2$?

[A] 3 [B] $\frac{1}{4}$ [C] 8 [D] 12

[10] _____

11. What is the solution set of the equation $\frac{x}{5}+\frac{x}{2}=14$?

[A] {10} [B] {4} [C] {20} [D] {49}

[11] _____

Part 2: Using the Distributive Property to Solve Equations

12. Solve for x: $15x-3(3x+4)=6$

[A] $\frac{1}{3}$ [B] $-\frac{1}{2}$ [C] 1 [D] 3

[12] _____

13. What is the value of n in the equation $0.6(n+10)=3.6$?

[A] 5 [B] -4 [C] -0.4 [D] 4

[13] _____

14. What is the value of p in the equation $2(3p-4)=10$?

[A] $\frac{1}{3}$ [B] $2\frac{1}{3}$ [C] 3 [D] 1

[14] _____

15. Parking charges at Superior Parking Garage are $5.00 for the first hour and $1.50 for each additional 30 minutes. If Margo has $12.50, what is the maximum amount of time she will be able to park her car at the garage?

[A] $2\frac{1}{2}$ hours [B] $6\frac{1}{2}$ hours

[C] $3\frac{1}{2}$ hours [D] 6 hours

[15] _____

16. Mario paid $44.25 in taxi fare from the hotel to the airport. The cab charged $2.25 for the first mile plus $3.50 for each additional mile. How many miles was it from the hotel to the airport?

[A] 12 [B] 13 [C] 11 [D] 10

[16] _____

17. A candy store sells 8-pound bags of mixed hazelnuts and cashews. If c pounds of cashews are in a bag, the price p of the bag can be found using the formula $p=2.59c+1.72(8-c)$. If one bag is priced at $18.11, how many pounds of cashews does it contain?

[17] _____

Lesson 3-3: Equations with Variables on Both Sides

Part 1: Solving Equations with Variables on Both Sides

18. What is the value of n in the equation $3n-8=32-n$?

[A] 6 [B] -10 [C] -6 [D] 10

[18] _____

19. Solve for m: $0.6m + 3 = 2m + 0.2$

[19] _____

20. Solve for x: $2(x - 3) = 1.2 - x$

[20] _____

21. If $3(x - 2) = 2x + 6$, the value of x is

[A] 0 [B] 5 [C] 12 [D] 20

[21] _____

22. If $2(x + 3) = x + 10$, then x equals

[A] 14 [B] 4 [C] 5 [D] 7

[22] _____

23. What is the value of x in the equation $13x - 2(x + 4) = 8x + 1$?

[A] 1 [B] 4 [C] 2 [D] 3

[23] _____

24. Solve for x: $3.3 - x = 3(x - 1.7)$

[24] _____

25. What is the value of x in the equation $5(2x - 7) = 15x - 10$?

[A] -5 [B] 0.6 [C] 1 [D] -9

[25] _____

26. What is the value of x in the equation $6(x - 2) = 36 - 10x$?

[A] 3 [B] -6 [C] 6 [D] 1.5

[26] _____

27. What is the value of w in the equation $\frac{1}{2}w + 7 = 2w - 2$?

[A] $3\frac{1}{3}$ [B] 2 [C] 3.6 [D] 6

[27] _____

28. What is the value of w in the equation $\frac{3}{4}w + 8 = \frac{1}{3}w - 7$?

[A] -36 [B] -13.846 [C] -0.2 [D] 2.4

[28] _____

29. What is the value of x in the equation $\frac{3}{4}x + 2 = \frac{5}{4}x - 6$?

[A] 16 [B] 4 [C] -4 [D] -16

[29] _____

30. If $x + y = 9x + y$, then x is equal to

[A] $\frac{1}{5}y$ [B] 8 [C] 0 [D] y

[30] _____

31. If $9x + 2a = 3a - 4x$, then x equals

[A] a [B] $\frac{5a}{12}$ [C] $-a$ [D] $\frac{a}{13}$

[31] _____

32. If $7x + 2a = 3x + 5a$, then x is equivalent to

[A] $\frac{7a}{10}$ [B] $\frac{7a}{4}$ [C] $\frac{3a}{4}$ [D] $\frac{3a}{10}$

[32] _____

33. If one-half of a number is 8 less than two-thirds of the number, what is the number?

[A] 32 [B] 54 [C] 48 [D] 24

[33] _____

34. The number of people on the school board is represented by x. Two subcommittees with an equal number of members are formed, one with $\frac{2}{3}x-5$ members and the other with $\frac{x}{4}$ members. How many people are on the school board?

[A] 12 [B] 20 [C] 8 [D] 4

[34] _____

Review P. 140-141: Using and Transforming Formulas

35. If $2m + 2p = 16$, p equals

[A] $8 - m$ [B] $16 - m$

[C] $16 + 2m$ [D] $9m$

[35] _____

36. If $bx-2=K,$ then x equals

[A] $\frac{2-K}{b}$ [B] $\frac{K-2}{b}$

[C] $\frac{K}{b}+2$ [D] $\frac{K+2}{b}$

[36] _____

37. If $c=2m+d,$ then m is equal to

[A] $\frac{c-d}{2}$ [B] $\frac{c}{2}-d$

[C] $c-\frac{d}{2}$ [D] $d-2c$

[37] _____

38. If $x=2a-b^2$, then a equals

[A] $\frac{b^2-x}{2}$ [B] $\frac{x-b^2}{2}$

[C] $\frac{x+b^2}{2}$ [D] $x+b^2$

[38] _____

39. If $2ax - 5x = 2$, then x is equivalent to

[A] $\frac{2+5a}{2a}$ [B] $7-2a$

[C] $\frac{1}{a-5}$ [D] $\frac{2}{2a-5}$

[39] _____

40. If $\frac{x}{4}-\frac{a}{b}=0,\ b\neq 0,$ then x is equal to

[A] $-\frac{a}{4b}$ [B] $\frac{4a}{b}$ [C] $\frac{a}{4b}$ [D] $-\frac{4a}{b}$

[40] _____

41. The equation $P = 2L + 2W$ is equivalent to

[A] $L=\frac{P+2W}{2}$ [B] $L=P-W$

[C] $L=\frac{P-2W}{2}$ [D] $2L=\frac{P}{2W}$

[41] _____

42. In the equation $A=p+prt,$ t is equivalent to

[A] $\frac{A-pr}{p}$ [B] $\frac{A-p}{pr}$

[C] $\frac{A}{pr}-p$ [D] $\frac{A}{P}-pr$

[42] _____

43. The formula for the volume of a right circular cylinder is $V = \pi r^2 h$. The value of *h* can be expressed as

[A] $\frac{\pi r^2}{V}$ [B] $V - \pi r^2$

[C] $\frac{V}{\pi} r^2$ [D] $\frac{V}{\pi r^2}$

[43] _____

44. The formula for potential energy is $P = mgh$, where *P* is potential energy, *m* is mass, *g* is gravity, and *h* is height. Which expression can be used to represent *g*?

[A] $P - mh$ [B] $P - m - h$

[C] $\frac{P}{mh}$ [D] $\frac{P}{m} - h$

[44] _____

45. Shoe sizes and foot length are related by the formula $S = 3F - 24$, where *S* represents the shoe size and *F* represents the length of the foot, in inches.

a Solve the formula for *F*.

b To the *nearest tenth of an inch*, how long is the foot of a person who wears a size $10\frac{1}{2}$ shoe?

[45] _____

46. If $\sqrt{x-a} = b, x > a$, which expression is equivalent to *x*?

[A] $b^2 - a$ [B] $b - a$

[C] $b + a$ [D] $b^2 + a$

[46] _____

47. The volume of any spherical balloon can be found by using the formula $V = \frac{4}{3}\pi r^3$. Write an equation for *r* in terms of *V* and π.

[47] _____

48. If the temperature in Buffalo is 23° Fahrenheit, what is the temperature in degrees Celsius? [Use the formula $C = \frac{5}{9}(F - 32)$.]

[A] -5 [B] 45 [C] 5 [D] -45

[48] _____

49. The formula $C = \frac{5}{9}(F - 32)$ can be used to find the Celsius temperature (*C*) for a given Fahrenheit temperature (*F*). What Celsius temperature is equal to a Fahrenheit temperature of 77°?

[A] 171° [B] 8° [C] 45° [D] 25°

[49] _____

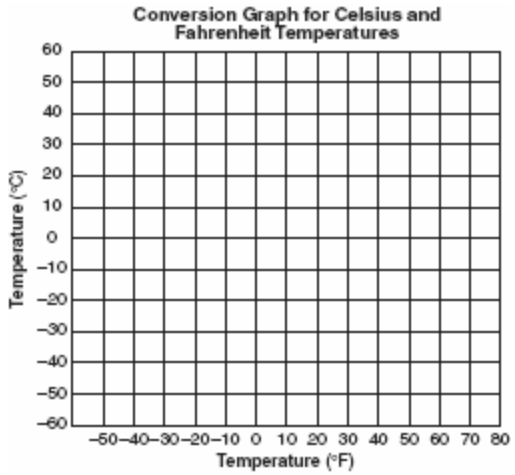
50. The formula for changing Celsius (C) temperature to Fahrenheit (F) temperature is $F = \frac{9}{5}C + 32$. Calculate, to the *nearest degree*, the Fahrenheit temperature when the Celsius temperature is -8.

[50] _____

51. The formula $C = \frac{5}{9}(F - 32)$ is used to convert Fahrenheit temperature, *F*, to Celsius temperature, *C*. What temperature, in degrees Fahrenheit, is equivalent to a temperature of 10° Celsius?

[51] _____

52. Connor wants to compare Celsius and Fahrenheit temperatures by drawing a conversion graph. He knows that $-40°C = -40°F$ and that $20°C = 68°F$. On the accompanying grid, construct the conversion graph and, using the graph, determine the Celsius equivalent of 25°F.



[52] _____

Lesson 3-4: Ratio and Proportion

Part 1: Ratios and Rates

53. A hockey team played *n* games, losing four of them and winning the rest. The ratio of games won to games lost is

[A] $\frac{n-4}{4}$ [B] $\frac{4}{n}$ [C] $\frac{4}{n-4}$ [D] $\frac{n}{4}$

[53] _____

54. If the instructions for cooking a turkey state "Roast turkey at 325° for 20 minutes per pound," how many hours will it take to roast a 20-pound turkey at 325°?

[54] _____

55. In a molecule of water, there are two atoms of hydrogen and one atom of oxygen. How many atoms of hydrogen are in 28 molecules of water?

[A] 56 [B] 42 [C] 14 [D] 29

[55] _____

56. A cake recipe calls for 1.5 cups of milk and 3 cups of flour. Seth made a mistake and used 5 cups of flour. How many cups of milk should he use to keep the proportions correct?

[A] 2.25 [B] 2.5 [C] 1.75 [D] 2

[56] _____

57. A total of $450 is divided into equal shares. If Kate receives four shares, Kevin receives three shares, and Anna receives the remaining two shares, how much money did Kevin receive?

[A] $100 [B] $150

[C] $200 [D] $250

[57] _____

58. During a recent winter, the ratio of deer to foxes was 7 to 3 in one county of New York State. If there were 210 foxes in the county, what was the number of deer in the county?

[A] 90 [B] 147 [C] 280 [D] 490

[58] _____

59. Sterling silver is made of an alloy of silver and copper in the ratio of 37:3. If the mass of a sterling silver ingot is 600 grams, how much silver does it contain?

[A] 48.65 g [B] 450 g

[C] 555 g [D] 200 g

[59] _____

60. There are 357 seniors in Harris High School. The ratio of boys to girls is 7:10. How many boys are in the senior class?

[A] 107 [B] 147 [C] 210 [D] 117

[60] _____

61. The profits in a business are to be shared by the three partners in the ratio of 3 to 2 to 5. The profit for the year was $176,500. Determine the number of dollars each partner is to receive.

[61] _____

62. At the Phoenix Surfboard Company, $306,000 in profits was made last year. This profit was shared by the four partners in the ratio 3:3:5:7. How much *more* money did the partner with the largest share make than one of the partners with the smallest share?

[62] _____

63. Which expression represents the number of yards in x feet?

[A] $3x$ [B] $12x$ [C] $\frac{x}{3}$ [D] $\frac{x}{12}$

[63] _____

64. If rain is falling at the rate of 2 inches per hour, how many inches of rain will fall in x minutes?

[A] $2x$ [B] $\frac{60}{x}$ [C] $\frac{x}{30}$ [D] $\frac{30}{x}$

[64] _____

65. Andy is 6 feet tall. If 1 inch equals 2.54 centimeters, how tall is Andy, to the *nearest centimeter*?

[A] 15 [B] 30 [C] 183 [D] 213

[65] _____

66. If a United States dollar is worth $1.41 in Canadian money, how much is $100 in Canadian money worth in United States money, to the *nearest cent*?

[66] _____

67. A car travels 110 miles in 2 hours. At the same rate of speed, how far will the car travel in h hours?

[A] $\frac{h}{220}$ [B] $220h$ [C] $55h$ [D] $\frac{h}{55}$

[67] _____

68. A rocket car on the Bonneville Salt Flats is traveling at a rate of 640 miles per hour. How much time would it take for the car to travel 384 miles at this rate?

[A] 1.7 hours [B] 36 minutes

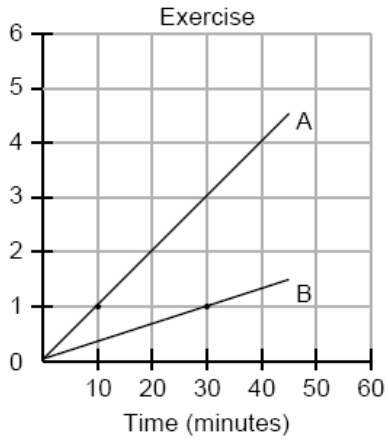
[C] 256 minutes [D] 245 minutes

[68] _____

69. Running at a constant speed, Andrea covers 15 miles in $2\frac{1}{2}$ hours. At this speed, how many *minutes* will it take her to run 2 miles?

[69] _____

70. During a 45-minute lunch period, Albert (*A*) went running and Bill (*B*) walked for exercise. Their times and distances are shown in the accompanying graph. How much faster was Albert running than Bill was walking, in miles per hour?



[70] _____

71. On her first trip, Sari biked 24 miles in T hours. The following week Sari biked 32 miles in T hours. Determine the ratio of her average speed on her second trip to her average speed on her first trip.

[A] $\frac{3}{4}$ [B] $\frac{2}{3}$ [C] $\frac{3}{2}$ [D] $\frac{4}{3}$

[71] _____

72. On a trip, a student drove 40 miles per hour for 2 hours and then drove 30 miles per hour for 3 hours. What is the student's average rate of speed, in miles per hour, for the whole trip?

[A] 36 [B] 37 [C] 34 [D] 35

[72] _____

73. If Jamar can run $\frac{3}{5}$ of a mile in 2 minutes 30 seconds, what is his rate in miles per minute?

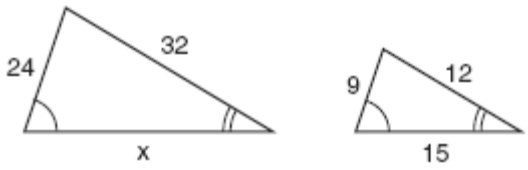
[A] $\frac{4}{5}$ [B] $\frac{6}{25}$ [C] $3\frac{1}{10}$ [D] $4\frac{1}{6}$

[73] _____

Lesson 3-5: Proportions and Similar Figures

Part 1: Similar Figures

74. The accompanying diagram shows two similar triangles.



Which proportion could be used to solve for x?

[A] $\frac{32}{12}=\frac{15}{x}$ [B] $\frac{32}{x}=\frac{12}{15}$

[C] $\frac{x}{24}=\frac{9}{15}$ [D] $\frac{24}{9}=\frac{15}{x}$

[74] _____

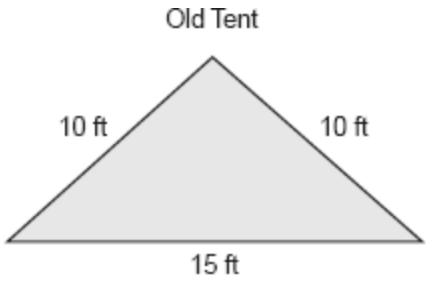
75. A triangle has sides whose lengths are 5, 12, and 13. A similar triangle could have sides with lengths of

[A] 6, 8, and 10 [B] 7, 24, and 25

[C] 10, 24, and 26 [D] 3, 4, and 15

[75] _____

76. The Rivera family bought a new tent for camping. Their old tent had equal sides of 10 feet and a floor width of 15 feet, as shown in the accompanying diagram.



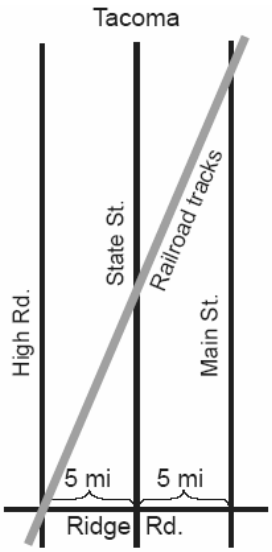
If the new tent is similar in shape to the old tent and has equal sides of 16 feet, how wide is the floor of the new tent?

[76] _____

77. Fran's favorite photograph has a length of 6 inches and a width of 4 inches. She wants to have it made into a poster with dimensions that are similar to those of the photograph. She determined that the poster should have a length of 24 inches. How many inches wide will the poster be?

[77] _____

78. The accompanying diagram shows a section of the city of Tacoma. High Road, State Street, and Main Street are parallel and 5 miles apart. Ridge Road is perpendicular to the three parallel streets. The distance between the intersection of Ridge Road and State Street and where the railroad tracks cross State Street is 12 miles. What is the distance between the intersection of Ridge Road and Main Street and where the railroad tracks cross Main Street?



[78] _____

Part 2: Indirect Measurement and Scale Drawings

79. On a map, 1 centimeter represents 40 kilometers. How many kilometers are represented by 8 centimeters?

[A] 280 [B] 5 [C] 320 [D] 48

[79] _____

80. Jordan and Missy are standing together in the schoolyard. Jordan, who is 6 feet tall, casts a shadow that is 54 inches long. At the same time, Missy casts a shadow that is 45 inches long. How tall is Missy?

[A] 86.4 in [B] 5 ft

[C] 38 in [D] 5 ft 6 in

[80] _____

81. An image of a building in a photograph is 6 centimeters wide and 11 centimeters tall. If the image is similar to the actual building and the actual building is 174 meters wide, how tall is the actual building, in meters?

[81] _____

82. If a girl 1.2 meters tall casts a shadow 2 meters long, how many meters tall is a tree that casts a shadow 75 meters long at the same time?

[82] _____

83. A 12-foot tree casts a 16-foot shadow. How many feet tall is a nearby tree that casts a 20-foot shadow at the same time?

[83] _____

Activity Lab P. 156-157: Scale Factor: Perimeter, Area, and Volume

84. The perimeter of $\Delta A'B'C'$, the image of ΔABC, is twice as large as the perimeter of ΔABC. What type of transformation has taken place?

[A] rotation [B] translation

[C] reflection [D] dilation

[84] _____

85. Delroy's sailboat has two sails that are similar triangles. The larger sail has sides of 10 feet, 24 feet, and 26 feet. If the shortest side of the smaller sail measures 6 feet, what is the perimeter of the *smaller* sail?

[A] 15 ft [B] 100 ft

[C] 36 ft [D] 60 ft

[85] _____

86. Two triangles are similar. The lengths of the sides of the smaller triangle are 3, 5, and 6, and the length of the longest side of the larger triangle is 18. What is the perimeter of the larger triangle?

[A] 18 [B] 14 [C] 24 [D] 42

[86] _____

87. The base of an isosceles triangle is 5 and its perimeter is 11. The base of a similar isosceles triangle is 10. What is the perimeter of the larger triangle?

[A] 22 [B] 15 [C] 110 [D] 21

[87] _____

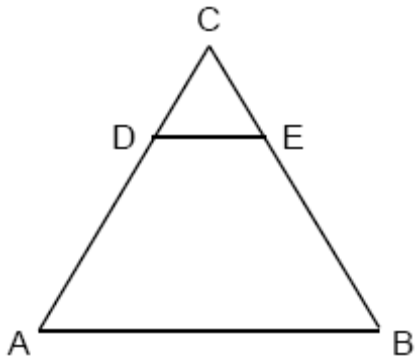
88. On a scale drawing of a new school playground, a triangular area has sides with lengths of 8 centimeters, 15 centimeters, and 17 centimeters. If the triangular area located on the playground has a perimeter of 120 meters, what is the length of its longest side?

[A] 45 m [B] 40 m

[C] 24 m [D] 51 m

[88] _____

89. In the accompanying diagram of equilateral triangle *ABC*, $DE = 5$ and $\overline{DE} \parallel \overline{AB}$.



If *AB* is three times as long as *DE*, what is the perimeter of quadrilateral *ABED*?

[A] 40 [B] 35 [C] 30 [D] 20

[89] _____

90. The lengths of the sides of two similar rectangular billboards are in the ratio 5:4. If 250 square feet of material is needed to cover the larger billboard, how much material, in square feet, is needed to cover the smaller billboard?

[90] _____

91. The ratio of the corresponding sides of two similar squares is 1 to 3. What is the ratio of the area of the smaller square to the area of the larger square ?

[A] 1:3 [B] 1:6 [C] $1:\sqrt{3}$ [D] 1:9

[91] _____

92. The perimeter of an equilateral triangle varies directly as the length of a side. When the length of a side is doubled, the perimeter of the triangle is

[A] halved [B] divided by 3

[C] multiplied by 3 [D] doubled

[92] _____

93. If the circumference of a circle is doubled, the diameter of the circle

[A] increases by 2 [B] is doubled

[C] remains the same

[D] is multiplied by 4

[93] _____

Lesson 3-6: Equations and Problem Solving

Part 1: Defining Variables

94. The sum of the ages of the three Romano brothers is 63. If their ages can be represented as consecutive integers, what is the age of the middle brother?

[94] _____

Part 2: Distance-Rate-Time Problems

95. A truck traveling at a constant rate of 45 miles per hour leaves Albany. One hour later a car traveling at a constant rate of 60 miles per hour also leaves Albany traveling in the same direction on the same highway. How long will it take for the car to catch up to the truck, if both vehicles continue in the same direction on the highway?

[95] _____

96. A bicyclist leaves Bay Shore traveling at an average speed of 12 miles per hour. Three hours later, a car leaves Bay Shore, on the same route, traveling at an average speed of 30 miles per hour. How many hours after the car leaves Bay Shore will the car catch up to the cyclist?

[A] 4 [B] 5 [C] 2 [D] 8

[96] _____

97. A truck travels 40 miles from point *A* to point *B* in exactly 1 hour. When the truck is halfway between point *A* and point *B*, a car starts from point *A* and travels at 50 miles per hour. How many miles has the car traveled when the truck reaches point *B*?

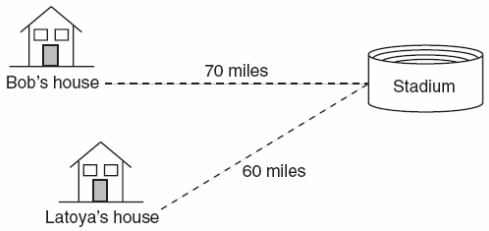
[A] 60 [B] 25 [C] 40 [D] 50

[97] _____

98. Two trains leave the same station at the same time and travel in opposite directions. One train travels at 80 kilometers per hour and the other at 100 kilometers per hour. In how many hours will they be 900 kilometers apart?

[98] _____

99. Bob and Latoya both drove to a baseball game at a college stadium. Bob lives 70 miles from the stadium and Latoya lives 60 miles from it, as shown in the accompanying diagram. Bob drove at a rate of 50 miles per hour, and Latoya drove at a rate of 40 miles per hour. If they both left home at the same time, who got to the stadium first?



[99] _____

100. A girl can ski down a hill five times as fast as she can climb up the same hill. If she can climb up the hill and ski down in a total of 9 minutes, how many minutes does it take her to climb up the hill?

[A] 1.8 [B] 7.2 [C] 7.5 [D] 4.5

[100] _____

Review P. 166-167: Proportions and Percents

101. A 14-gram serving of mayonnaise contains 11 grams of fat. What percent of the mayonnaise, to the *nearest tenth of a percent*, is fat?

[101] _____

102. A recent survey shows that the average man will spend 141,288 hours sleeping, 85,725 hours working, 81,681 hours watching television, 9,945 hours commuting, 1,662 hours kissing, and 363,447 hours on other tasks during his lifetime. What percent of his life, to the *nearest tenth of a percent*, does he spend sleeping?

[102] _____

103. Twenty-five percent of 88 is the same as what percent of 22?

[A] 100% [B] $12\frac{1}{2}\%$

[C] 40% [D] 50%

[103] _____

104. Ninety percent of the ninth grade students at Richbartville High School take algebra. If 180 ninth grade students take algebra, how many ninth grade students do *not* take algebra?

[104] _____

105. Linda paid $48 for a jacket that was on sale for 25% of the original price. What was the original price of the jacket?

[A] $60 [B] $96 [C] $192 [D] $72

[105] _____

106. Sue bought a picnic table on sale for 50% off the original price. The store charged her 10% tax and her final cost was $22.00. What was the original price of the picnic table?

[106] _____

107. A painting that regularly sells for a price of $55 is on sale for 20% off. The sales tax on the painting is 7%. Will the final total cost of the painting differ depending on whether the salesperson deducts the discount before adding the sales tax or takes the discount after computing the sum of the original price and the sales tax on $55?

[107] _____

108. Walter is a waiter at the Towne Diner. He earns a daily wage of $50, plus tips that are equal to 15% of the total cost of the dinners he serves. What was the total cost of the dinners he served if he earned $170 on Tuesday?

[108] _____

109. In bowling leagues, some players are awarded extra points called their "handicap." The "handicap" in Anthony's league is 80% of the difference between 200 and the bowler's average. Anthony's average is 145. What is Anthony's "handicap"?

[109] _____

110. The Edison Lightbulb Company tests 5% of their daily production of lightbulbs. If 500 bulbs were tested on Tuesday, what was the total number of bulbs produced that day?

[A] 10,000 [B] 100,000

[C] 25 [D] 1,000

[110] _____

111. In his will, a man leaves one-half of his money to his wife, one-half of what is then left to his older child, and one-half of what is then left to his younger child. His two cousins divide the remainder equally, each receiving $2,000. What was the total amount of money in the man's will?

[A] $16,000 [B] $40,000

[C] $32,000 [D] $24,000

[111] _____

112. A boy got 50% of the questions on a test correct. If he had 10 questions correct out of the first 12, and $\frac{1}{4}$ of the remaining questions correct, how many questions were on the test?

[A] 16 [B] 28 [C] 24 [D] 26

[112] _____

113. There are 28 students in a mathematics class. If $\frac{1}{4}$ of the students are called to the guidance office, $\frac{1}{3}$ of the remaining students are called to the nurse, and, finally, $\frac{1}{2}$ of those left go to the library, how many students remain in the classroom?

[113] _____

114. In a town election, candidates *A* and *B* were running for mayor. There were 30,500 people eligible to vote, and $\frac{3}{4}$ of them actually voted. Candidate *B* received $\frac{1}{3}$ of the votes cast. How many people voted for candidate *B*? What percent of the votes cast, to the *nearest tenth of a percent*, did candidate *A* receive?

[114] _____

115. After an ice storm, the following headlines were reported in the *Glacier County Times*:
Monday: Ice Storm Devastates County - 8 out of every 10 homes lose electrical power
Tuesday: Restoration Begins - Power restored to $\frac{1}{2}$ of affected homes
Wednesday: More Freezing Rain - Power lost by 20% of homes that had power on Tuesday
Based on these headlines, what fractional portion of homes in Glacier County had electrical power on Wednesday?

[115] _____

Lesson 3-7: Percent of Change

Part 1: Percent of Change

116. The world population was 4.2 billion people in 1982. The population in 1999 reached 6 billion. Find the percent of change from 1982 to 1999.

[116] _____

117. Rashawn bought a CD that cost $18.99 and paid $20.51, including sales tax. What was the rate of the sales tax?

[A] 8% [B] 2% [C] 3% [D] 5%

[117] _____

Part 2: Percent Error

118. A factory packs CD cases into cartons for a music company. Each carton is designed to hold 1,152 CD cases. The Quality Control Unit in the factory expects an error of less than 5% over or under the desired packing number. What is the *least* number and the *most* number of CD cases that could be packed in a carton and still be acceptable to the Quality Control Unit?

[118] _____

Lesson 3-8: Finding and Estimating Square Roots

Part 1: Finding Square Roots

119. The expression $\sqrt{54-b}$ is equivalent to a positive integer when b is equal to

[A] -10 [B] 16 [C] 4 [D] 54

[119] _____

Part 2: Estimating and Using Square Roots

120. The expression $\sqrt{93}$ is a number between

[A] 8 and 9 [B] 46 and 47

[C] 9 and 10 [D] 3 and 9

[120] _____

121. Which point on the accompanying number line best represents the position of $\sqrt{5}$?

[A] *D* [B] *A* [C] *B* [D] *C*

[121] _____

122. The amount of time, *t*, in seconds, it takes an object to fall a distance, *d*, in meters, is expressed by the formula $t = \sqrt{\frac{d}{4.9}}$.

Approximately how long will it take an object to fall 75 meters?

[A] 2.34 sec [B] 0.26 sec

[C] 7.7 sec [D] 3.9 sec

[122] _____

Lesson 3-9: The Pythagorean Theorem

Part 1: Solving Problems Using the Pythagorean Theorem

123. The set of integers {3,4,5} is a Pythagorean triple. Another such set is

[A] {8,15,17} [B] {6,7,8}

[C] {6,12,13} [D] {6,8,12}

[123] _____

124. A builder is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the sides form 90° angles, what should each diagonal measure?

[A] 46 ft [B] 16 ft [C] 30 ft [D] 34 ft

[124] _____

125. If the length of the legs of a right triangle are 5 and 7, what is the length of the hypotenuse?

[A] $\sqrt{74}$ [B] $2\sqrt{6}$

[C] $2\sqrt{3}$ [D] $\sqrt{2}$

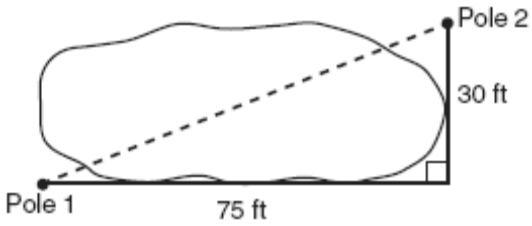
[125] _____

126. If the length of a rectangular television screen is 20 inches and its height is 15 inches, what is the length of its diagonal, in inches?

[A] 25 [B] 13.2 [C] 5 [D] 35

[126] _____

127. The NuFone Communications Company must run a telephone line between two poles at opposite ends of a lake, as shown in the accompanying diagram. The length and width of the lake are 75 feet and 30 feet, respectively.

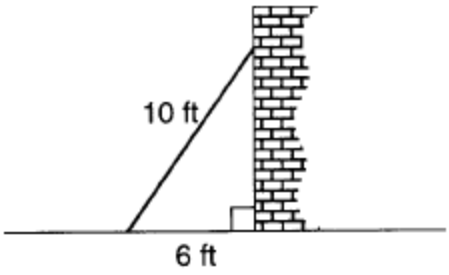


What is the distance between the two poles, to the *nearest foot*?

[A] 45 [B] 69 [C] 105 [D] 81

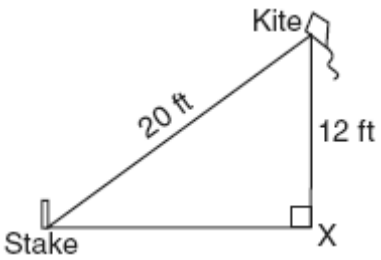
[127] _____

128. A wall is supported by a brace 10 feet long, as shown in the diagram below. If one end of the brace is placed 6 feet from the base of the wall, how many feet up the wall does the brace reach?



[128] _____

129. The accompanying diagram shows a kite that has been secured to a stake in the ground with a 20-foot string. The kite is located 12 feet from the ground, directly over point *X*. What is the distance, in feet, between the stake and point *X*?



[129] _____

130. How many feet from the base of a house must a 39-foot ladder be placed so that the top of the ladder will reach a point on the house 36 feet from the ground?

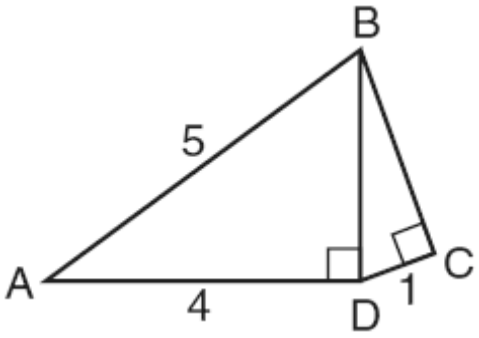
[130] _____

131. A woman has a ladder that is 13 feet long. If she sets the base of the ladder on level ground 5 feet from the side of a house, how many feet above the ground will the top of the ladder be when it rests against the house?

[A] 11 [B] 12 [C] 9 [D] 8

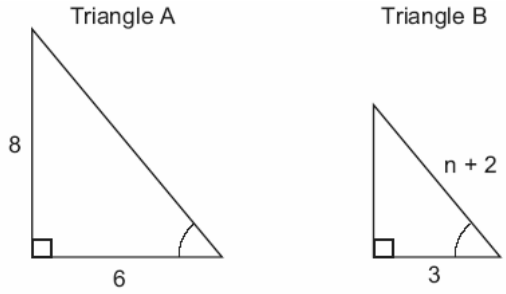
[131] _____

132. In the accompanying diagram of right triangles *ABD* and *DBC*, $AB = 5$, $AD = 4$, and $CD = 1$. Find the length of $\overline{BC}$, to the *nearest tenth*.



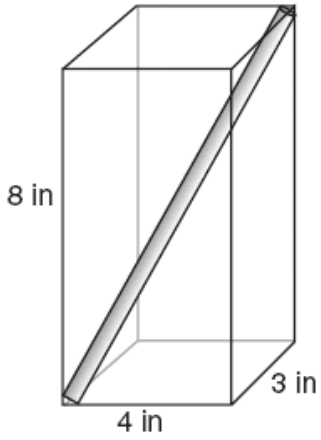
[132] _____

133. In the accompanying diagram, triangle *A* is similar to triangle *B*. Find the value of *n*.



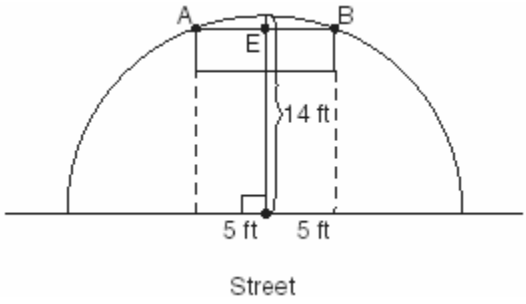
[133] _____

134. A straw is placed into a rectangular box that is 3 inches by 4 inches by 8 inches, as shown in the accompanying diagram. If the straw fits exactly into the box diagonally from the bottom left front corner to the top right back corner, how long is the straw, to the *nearest tenth of an inch*?



[134] _____

135. The accompanying diagram shows a semicircular arch over a street that has a radius of 14 feet. A banner is attached to the arch at points *A* and *B*, such that $AE = EB = 5$ feet. How many feet above the ground are these points of attachment for the banner?

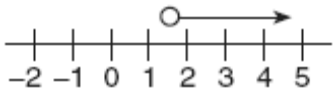


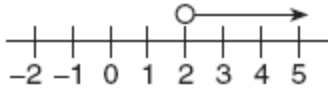
[135] _____

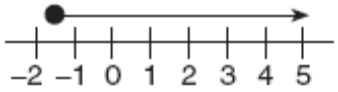
Lesson 4-1: Inequalities and Their Graphs

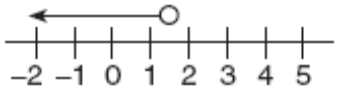
Part 2: Graphing and Writing Inequalities in One Variable

1. Which graph best represents the solution set for the inequality $x > \sqrt{2}$?

[A] 

[B] 

[C] 

[D] 

[1] _____

Lesson 4-4: Solving Multi-Step Inequalities

Part 1: Solving Inequalities with Variables on One Side

2. In the set of positive integers, what is the solution set of the inequality $2x - 3 < 5$?

[A] {1, 2, 3} [B] {1, 2, 3, 4}

[C] {0, 1, 2, 3} [D] {0, 1, 2, 3, 4}

[2] _____

3. Which number is in the solution set of the inequality $5x + 3 > 38$?

[A] 7 [B] 6 [C] 8 [D] 5

[3] _____

4. Find all negative odd integers that satisfy the following inequality:

$$-3x + 1 \leq 17$$

[4] _____

5. There are 461 students and 20 teachers taking buses on a trip to a museum. Each bus can seat a maximum of 52. What is the *least* number of buses needed for the trip?

[A] 8 [B] 9 [C] 11 [D] 10

[5] _____

6. In a hockey league, 87 players play on seven different teams. Each team has at least 12 players. What is the largest possible number of players on any one team?

[A] 13 [B] 15 [C] 14 [D] 21

[6] _____

7. A doughnut shop charges $0.70 for each doughnut and $0.30 for a carryout box. Shirley has $5.00 to spend. At most, how many doughnuts can she buy if she also wants them in one carryout box?

[7] _____

8. A swimmer plans to swim at least 100 laps during a 6-day period. During this period, the swimmer will increase the number of laps completed each day by one lap. What is the *least* number of laps the swimmer must complete on the first day?

[8] _____

Part 2: Solving Inequalities with Variables on Both Sides

9. The inequality $\frac{1}{2}x+3<2x-6$ is equivalent to

[A] $x>-\frac{5}{6}$ [B] $x<6$

[C] $x>6$ [D] $x<-\frac{5}{6}$

[9] _____

Lesson 4-5: Compound Inequalities

Part 1: Solving Compound Inequalities Containing *And*

10. Which inequality is represented in the graph below?

[A] $-4\le x<2$ [B] $-4\le x\le 2$

[C] $-4<x\le 2$ [D] $-4<x<2$

[10] _____

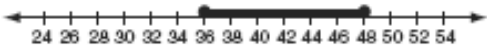
11. Which inequality is represented in the accompanying graph?

[A] $-3<x<4$ [B] $-3\le x\le 4$

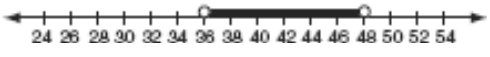
[C] $-3\le x<4$ [D] $-3<x\le 4$

[11] _____

12. In order to be admitted for a certain ride at an amusement park, a child must be greater than or equal to 36 inches tall and less than 48 inches tall. Which graph represents these conditions?

[A] 

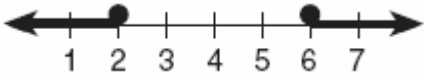
[B] 

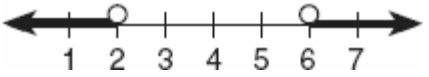
[C] 

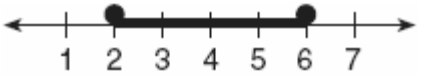
[D] 

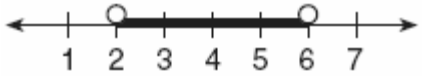
[12] _____

13. Which graph represents the solution set for $2x-4\le 8$ and $x+5\ge 7$?

[A] 

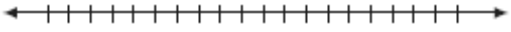
[B] 

[C] 

[D] 

[13] _____

14. The manufacturer of Ron's car recommends that the tire pressure be at least 26 pounds per square inch and less than 35 pounds per square inch. On the accompanying number line, graph the inequality that represents the recommended tire pressure.



[14] _____

15. If $a + b$ is less than $c + d$, and $d + e$ is less than $a + b$, then e is

[A] less than c [B] less than d

[C] greater than d [D] equal to c

[15] _____

16. On June 17, the temperature in New York City ranged from 90° to 99°, while the temperature in Niagara Falls ranged from 60° to 69°. The difference in the temperatures in these two cities must be between

[A] 25° and 35° [B] 30° and 40°

[C] 20° and 30° [D] 20° and 40°

[16] _____

Lesson 4-6: Absolute Value Equations and Inequalities

Part 2: Solving Absolute Value Inequalities

17. Which equation states that the temperature, t, in a room is less than 3° from 68°?

[A] $|68 + t| < 3$ [B] $|68 - t| < 3$

[C] $|3 - t| < 68$ [D] $|3 + t| < 68$

[17] _____

18. The solution set of $|3x + 2| < 1$ contains

[A] both positive and negative real numbers

[B] only negative real numbers

[C] only positive real numbers

[D] no real numbers

[18] _____

19. What is the solution set of the inequality $|3 - 2x| \geq 4$?

[A] $\{x|-\frac{1}{2} \leq x \leq \frac{7}{2}\}$

[B] $\{x|x \leq -\frac{1}{2} \text{ or } x \geq \frac{7}{2}\}$

[C] $\{x|x \leq \frac{7}{2} \text{ or } x \geq \frac{1}{2}\}$

[D] $\{x|\frac{7}{2} \leq x \leq -\frac{1}{2}\}$

[19] _____

20. What is the solution of the inequality $|x + 3| \leq 5$?

[A] $x \leq -8$ *or* $x \geq 2$ [B] $-8 \leq x \leq 2$

[C] $-2 \leq x \leq 8$ [D] $x \leq -2$ *or* $x \geq 8$

[20] _____

21. The solution of $|2x - 3| < 5$ is

[A] $x < 4$ [B] $-1 < x < 4$

[C] $x > -1$ [D] $x < -1$ or $x > 4$

[21] _____

22. What is the solution of the inequality $|y + 8| > 3$?

[A] $-11 < y < -5$ [B] $y > -5$ or $y < -11$

[C] $-5 < y < 11$ [D] $y > -5$

[22] _____

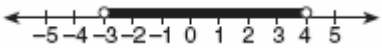
23. What is the solution set of the inequality $|2x-1|<9$?

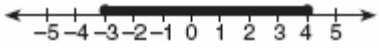
[A] $\{x|x<-4\}$ [B] $\{x|x<-4 \text{ or } x>5\}$

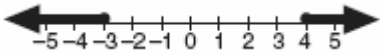
[C] $\{x|-4<x<5\}$ [D] $\{x|x<5\}$

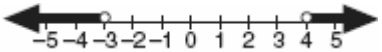
[23] _____

24. Which graph represents the solution set of $|2x-1|<7$?

[A] 

[B] 

[C] 

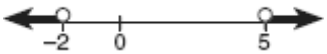
[D] 

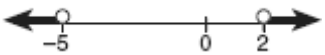
[24] _____

25. Which graph represents the solution set for the expression $|2x+3|>7$?

[A] 

[B] 

[C] 

[D] 

[25] _____

26. Which inequality is represented by the accompanying graph?

[A] $|x+3|\geq 2$ [B] $|x-5|\geq 2$

[C] $|x+2|>5$ [D] $|x-1|\leq 5$

[26] _____

27. The solution set of which inequality is represented by the accompanying graph?

[A] $|x-2|<7$ [B] $|x-2|>7$

[C] $|2-x|>-7$ [D] $|2-x|<-7$

[27] _____

28. The inequality $|1.5C-24|\leq 30$ represents the range of monthly average temperatures, C, in degrees Celsius, for Toledo, Ohio. Solve for C.

[28] _____

29. The heights, h, of the students in the chorus at Central Middle School satisfy the inequality $\left|\frac{h-57.5}{2}\right|\leq 3.25$, when h is measured *in inches*. Determine the interval in which these heights lie and express your answer to the *nearest tenth of a foot*. [Only an algebraic solution can receive full credit.]

[29] _____

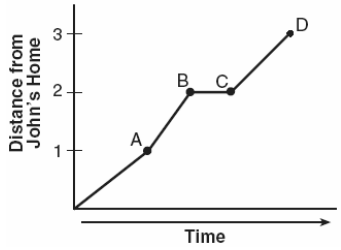
30. A depth finder shows that the water in a certain place is 620 feet deep. The difference between d, the actual depth of the water, and the reading is $|d-620|$ and must be less than or equal to $0.05d$. Find the minimum and maximum values of d, to the *nearest tenth of a foot*.

[30] _____

Lesson 5-1: Relating Graphs to Events

Part 1: Interpreting, Sketching, and Analyzing Graphs

1. John left his home and walked 3 blocks to his school, as shown in the accompanying graph.



What is one possible interpretation of the section of the graph from point *B* to point *C*?

[A] John arrived at school and stayed throughout the day.

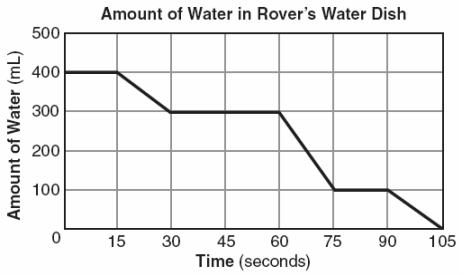
[B] John reached the top of a hill and began walking on level ground.

[C] John waited before crossing a busy street.

[D] John returned home to get his mathematics homework.

[1] _____

2. The accompanying graph shows the amount of water left in Rover's water dish over a period of time.



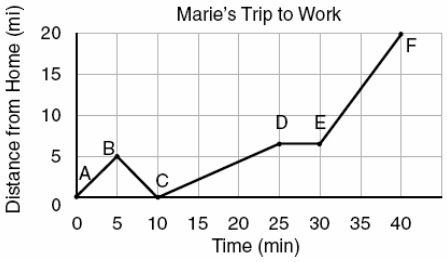
How long did Rover wait from the end of his first drink to the start of his second drink of water?

[A] 75 sec [B] 30 sec

[C] 10 sec [D] 60 sec

[2] _____

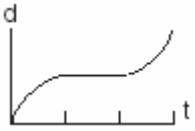
3. The accompanying graph shows Marie's distance from home (*A*) to work (*F*) at various times during her drive.

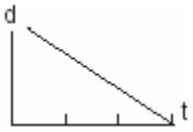


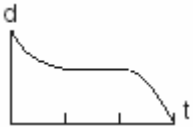
a Marie left her briefcase at home and had to return to get it. State which point represents when she turned back around to go home and explain how you arrived at that conclusion.
b Marie also had to wait at the railroad tracks for a train to pass. How long did she wait?

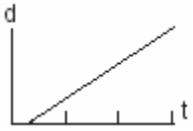
[3] _____

4. A bug travels up a tree, from the ground, over a 30-second interval. It travels fast at first and then slows down. It stops for 10 seconds, then proceeds slowly, speeding up as it goes. Which sketch best illustrates the bug's distance (*d*) from the ground over the 30-second interval (*t*)?

[A] 

[B] 

[C] 

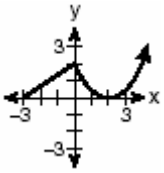
[D] 

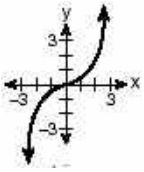
[4] _____

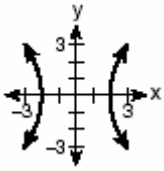
Lesson 5-2: Relations and Functions

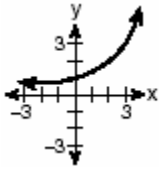
Part 1: Identifying Relations and Functions

5. Which graph is *not* a function?

[A] 

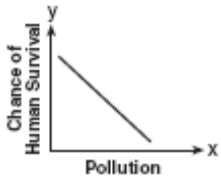
[B] 

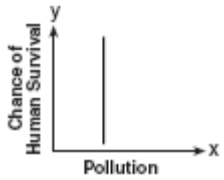
[C] 

[D] 

[5] _____

6. Which graph does not represent a function of *x*?

[A] 

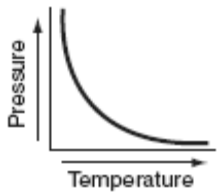
[B] 

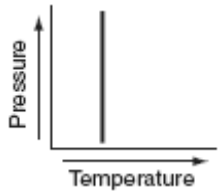
[C] 

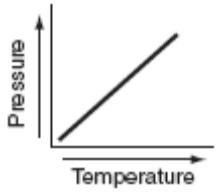
[D] 

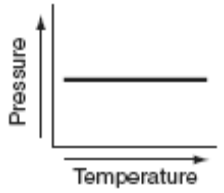
[6] _____

7. Each graph below represents a possible relationship between temperature and pressure. Which graph does *not* represent a function?

[A] 

[B] 

[C] 

[D] 

[7] _____

8. Which set of ordered pairs is *not* a function?

[A] {(4,1), (5,1), (6,1), (7,1)}

[B] {(1,2), (3,4), (4,5), (5,6)}

[C] {(3,1), (2,1), (1,2), (3,2)}

[D] {(0,0), (1,1), (2,2), (3,3)}

[8] _____

9. Which set of ordered pairs does *not* represent a function?

[A] {(3,-2), (4,-3), (5,-4), (6,-5)}

[B] {(3,-2), (-2,3), (4,-1), (-1,4)}

[C] {(3,-2), (3,-4), (4,-1), (4,-3)}

[D] {(3,-2), (5,-2), (4,-2), (-1,-2)}

[9] _____

Part 2: Evaluating Functions

10. If $f(x) = 4x^0 + (4x)^{-1}$, what is the value of $f(4)$?

[A] $1\frac{1}{16}$ [B] $4\frac{1}{16}$ [C] -12 [D] 0

[10] _____

Lesson 5-5: Direct Variation

Part 1: Writing the Equation of a Direct Variation

11. Which equation represents the direct variation relationship of the equation $\frac{x}{y} = \frac{1}{2}$?

[A] $y = 3x$ [B] $x = 2y$

[C] $y = x + \frac{1}{2}$ [D] $y = 2x$

[11] _____

Part 2: Proportions and Equations of Direct Variations

12. Which table does *not* show an example of direct variation?

[A]

x	y
1	4
2	8
3	12
4	16

[B]

x	y
2	24
4	12
6	8
8	6

[C]

x	y
–4	–20
–3	–15
–2	–10
–1	–5

[D]

x	y
1	$\frac{1}{2}$
2	1
3	$\frac{3}{2}$
4	2

[12] _____

13. Julio's wages vary directly as the number of hours that he works. If his wages for 5 hours are $29.75, how much will he earn for 30 hours?

[13] _____

Lesson 5-6: Inverse Variation

Part 1: Solving Inverse Variations

14. Explain how a person can determine if a set of data represents inverse variation and give an example using a table of values.

[14] _____

15. For a rectangular garden with a fixed area, the length of the garden varies inversely with the width. Which equation represents this situation for an area of 36 square units?

[A] $y = \frac{36}{x}$ [B] $x - y = 36$

[C] $x + y = 36$ [D] $y = 36x$

[15] _____

16. If R varies inversely as S, when S is doubled, R is multiplied by

[A] $\frac{1}{4}$ [B] $\frac{1}{2}$ [C] 4 [D] 2

[16] _____

17. In a given rectangle, the length varies inversely as the width. If the length is doubled, the width will

[A] increase by 2 [B] be multiplied by 2

[C] be divided by 2 [D] remain the same

[17] _____

18. The speed of a laundry truck varies inversely with the time it takes to reach its destination. If the truck takes 3 hours to reach its destination traveling at a constant speed of 50 miles per hour, how long will it take to reach the same location when it travels at a constant speed of 60 miles per hour?

[A] 2 hours [B] $2\frac{2}{3}$ hours

[C] $2\frac{1}{3}$ hours [D] $2\frac{1}{2}$ hours

[18] _____

19. The time it takes to travel to a location varies inversely to the speed traveled. It takes 4 hours driving at an average speed of 55 miles per hour to reach a location. To the *nearest tenth of an hour*, how long will it take to reach the same location driving at an average speed of 50 miles per hour?

[19] _____

20. When air is pumped into an automobile tire, the pressure is inversely proportional to the volume. If the pressure is 35 pounds when the volume is 120 cubic inches, what is the pressure, in pounds, when the volume is 140 cubic inches?

[20] _____

21. Boyle's Law states that the pressure of compressed gas is inversely proportional to its volume. The pressure of a certain sample of a gas is 16 kilopascals when its volume is 1,800 liters. What is the pressure, in kilopascals, when its volume is 900 liters?

[21] _____

22. According to Boyle's Law, the pressure, p, of a compressed gas is inversely proportional to the volume, v. If a pressure of 20 pounds per square inch exists when the volume of the gas is 500 cubic inches, what is the pressure when the gas is compressed to 400 cubic inches?

[A] $50\ lb/in^2$ [B] $25\ lb/in^2$

[C] $16\ lb/in^2$ [D] $40\ lb/in^2$

[22] _____

23. Camisha is paying a band $330 to play at her graduation party. The amount each member earns, *d*, varies inversely as the number of members who play, *n*. The graph of the equation that represents the relationship between *d* and *n* is an example of

[A] an ellipse [B] a hyperbola

[C] a line [D] a parabola

[23] _____

24. The price per person to rent a limousine for a prom varies inversely as the number of passengers. If five people rent the limousine, the cost is $70 each. How many people are renting the limousine when the cost *per couple* is $87.50?

[24] _____

25. To balance a seesaw, the distance, in feet, a person is from the fulcrum is inversely proportional to the person's weight, in pounds. Bill, who weighs 150 pounds, is sitting 4 feet away from the fulcrum. If Dan weighs 120 pounds, how far from the fulcrum should he sit to balance the seesaw?

[A] 3.5 ft [B] 5 ft [C] 3 ft [D] 4.5 ft

[25] _____

26. A pulley that has a diameter of 8 inches is belted to a pulley that has a diameter of 12 inches. The 8-inch-diameter pulley is running at 1,548 revolutions per minute. If the speeds of the pulleys vary inversely to their diameters, how many revolutions per minute does the larger pulley make?

[26] _____

Activity Lab P. 304-305: Histograms

27. The test scores for 10 students in Ms. Sampson's homeroom were 61, 67, 81, 83, 87, 88, 89, 90, 98, and 100. Which frequency table is accurate for this set of data?

[A]

Interval	Frequency
61–70	2
71–80	0
81–90	6
91–100	2

[B]

Interval	Frequency
61–70	2
71–80	2
81–90	7
91–100	10

[C]

Interval	Frequency
61–70	2
71–80	0
81–90	8
91–100	10

[D]

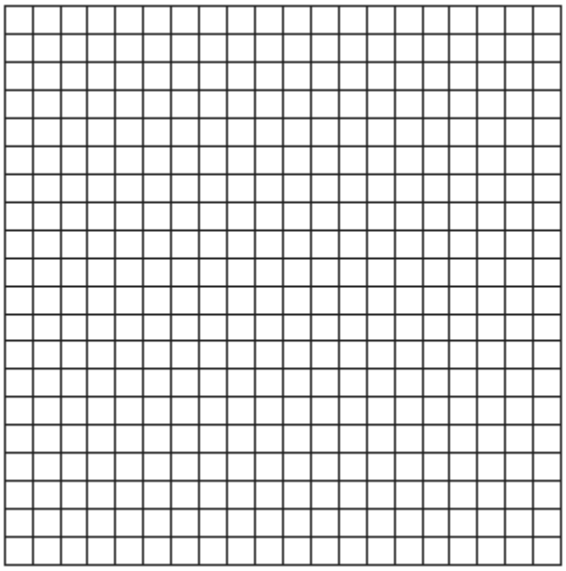
Interval	Frequency
61–70	2
71–80	2
81–90	8
91–100	10

[27] _____

28. The following set of data represents the scores on a mathematics quiz:
58, 79, 81, 99, 68, 92, 76, 84, 53, 57, 81, 91, 77, 50, 65, 57, 51, 72, 84, 89
Complete the frequency table below and, on the accompanying grid, draw and label a frequency histogram of these scores.

Mathematics Quiz Scores

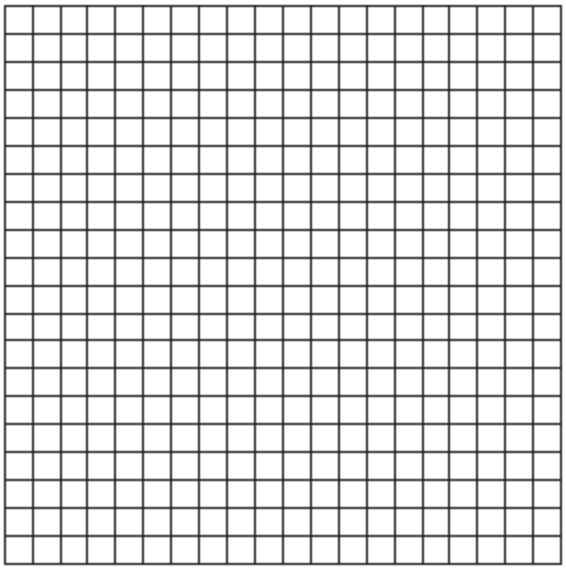
Interval	Tally	Frequency
50–59		
60–69		
70–79		
80–89		
90–99		



[28] _____

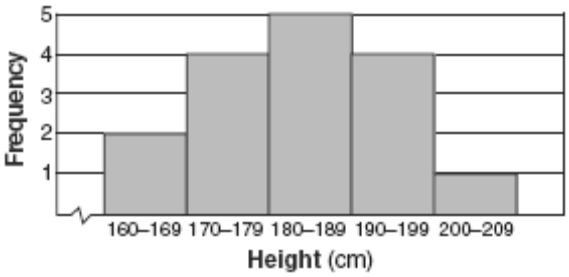
29. The scores on a mathematics test were 70, 55, 61, 80, 85, 72, 65, 40, 74, 68, and 84.
Complete the accompanying table, and use the table to construct a frequency histogram for these scores.

Score	Tally	Frequency
40–49		
50–59		
60–69		
70–79		
80–89		



[29] _____

30. The accompanying histogram shows the heights of the students in Kyra's health class.

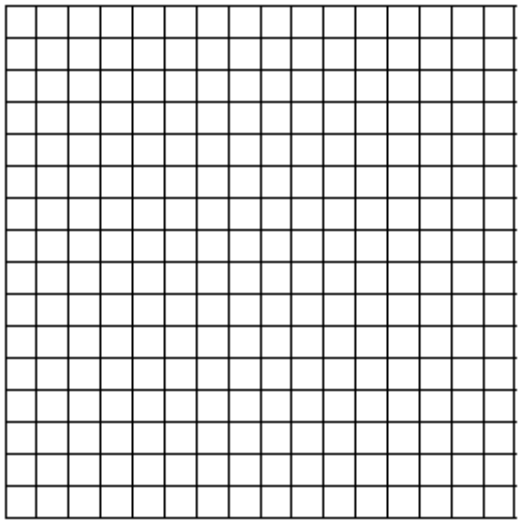


What is the total number of students in the class?

[A] 15 [B] 209 [C] 5 [D] 16

[30] _____

31. On a science quiz, 20 students received the following scores: 100, 95, 95, 90, 85, 85, 85, 80, 80, 80, 80, 75, 75, 75, 70, 70, 65, 65, 60, 55. Construct a statistical graph, such as a histogram or a stem-and-leaf plot, to display this data. [*Be sure to title the graph and label all axes or parts used.*]
If your type of plot requires a grid, show your work here.

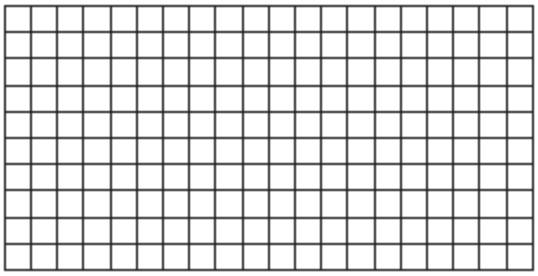


If no grid is necessary, show your work here.

[31] _____

32. Sarah's mathematics grades for one marking period were 85, 72, 97, 81, 77, 93, 100, 75, 86, 70, 96, and 80.
a Complete the tally sheet and frequency table below, and construct and label a frequency histogram for Sarah's grades using the accompanying grid.

Interval (grades)	Tally	Frequency
61–70		
71–80		
81–90		
91–100		



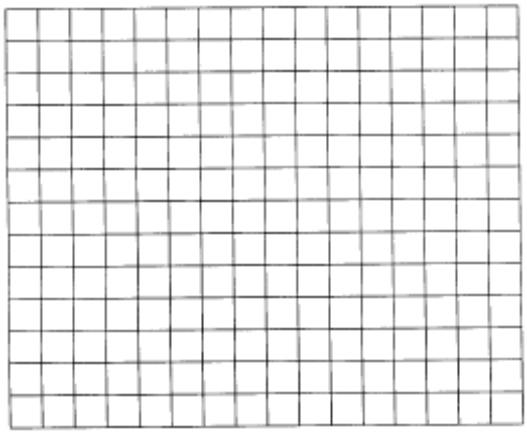
b Which interval contains the 75th percentile (upper quartile)?

[32] _____

33. In the time trials for the 400-meter run at the state sectionals, the 15 runners recorded the times shown in the table below.

400-Meter Run	
Time (sec)	Frequency
50.0–50.9	
51.0–51.9	II
52.0–52.9	𝍸 I
53.0–53.9	III
54.0–54.9	IIII

a Using the data from the frequency column, draw a frequency histogram on the grid provided below.

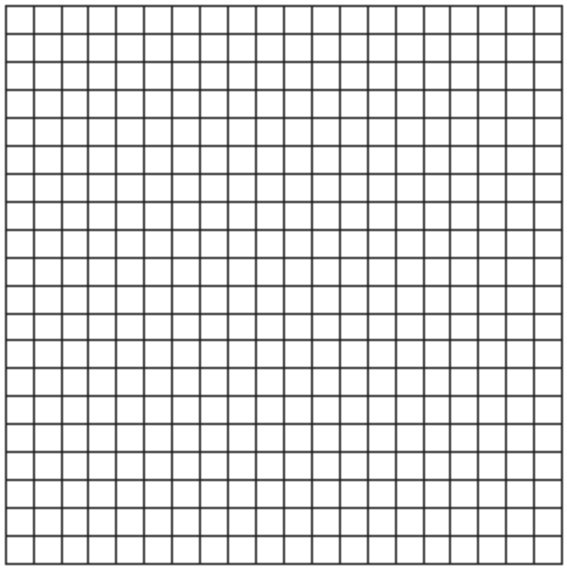


b What percent of the runners completed the time trial between 52.0 and 53.9 seconds?

[33] _____

34. The following data consists of the weights, in pounds, of 30 adults:
195, 206, 100, 98, 150, 210, 195, 106, 195, 168, 180, 212, 104, 195, 100,
216, 195, 209, 112, 99, 206, 116, 195, 100, 142, 100, 135, 98, 160, 155
Using the data, complete the accompanying cumulative frequency table and construct a cumulative frequency histogram on the grid below.

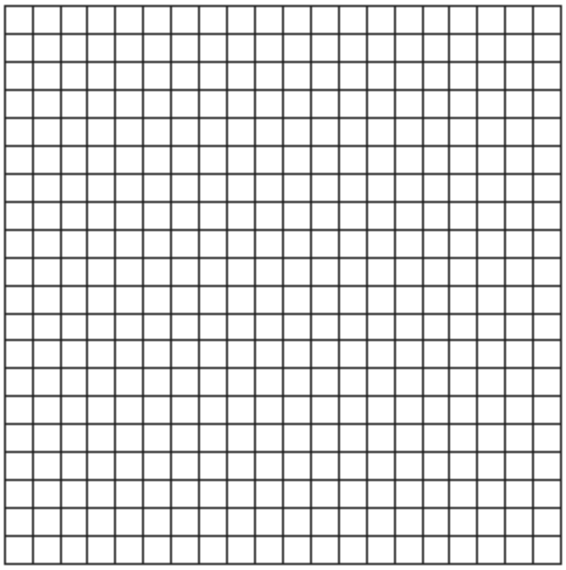
Interval	Frequency	Cumulative Frequency
51–100		
101–150		
151–200		
201–250		



[34] _____

35. The accompanying table shows the weights, in pounds, for the students in an algebra class. Using the data, complete the cumulative frequency table and construct a cumulative frequency histogram on the grid below.

Interval	Frequency	Cumulative Frequency
91–100	6	
101–110	3	
111–120	0	
121–130	3	
131–140	0	
141–150	2	
151–160	2	

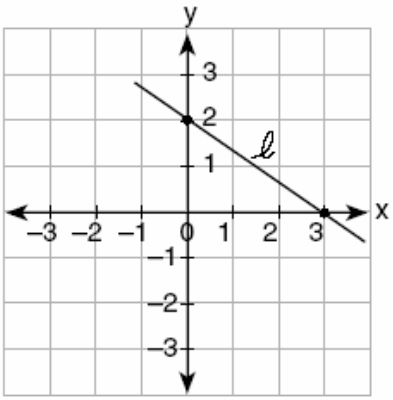


[35] _____

Lesson 6-1: Rate of Change and Slope

Part 2: Finding Slope

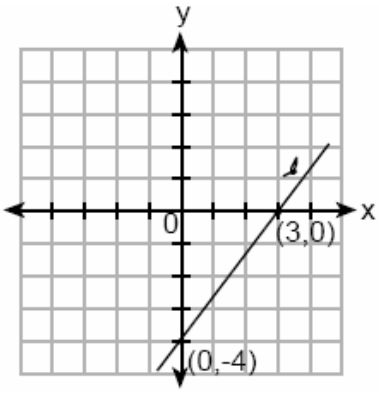
1. What is the slope of line ℓ in the accompanying diagram?



[A] $\frac{2}{3}$ [B] $-\frac{2}{3}$ [C] $\frac{3}{2}$ [D] $-\frac{3}{2}$

[1] _____

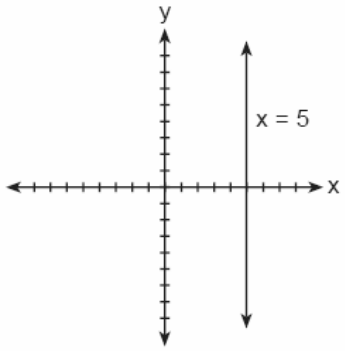
2. What is the slope of line ℓ shown in the accompanying diagram?



[A] $\frac{3}{4}$ [B] $-\frac{4}{3}$ [C] $\frac{4}{3}$ [D] $-\frac{3}{4}$

[2] _____

3. The accompanying figure shows the graph of the equation $x = 5$.



What is the slope of the line $x = 5$?

[A] 0 [B] undefined [C] -5 [D] 5

[3] _____

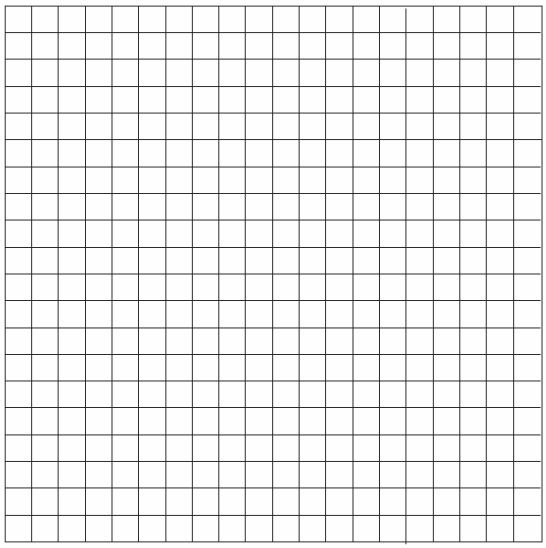
4. If a line is horizontal, its slope is

[A] 1 [B] negative

[C] 0 [D] undefined

[4] _____

5. A straight line with slope 5 contains the points (1,2) and (3,*K*). Find the value of *K*. [The use of the accompanying grid is optional.]



[5] _____

Lesson 6-2: Slope-Intercept Form

Part 1: Writing Linear Equations

6. An equation of the line that has a slope of 3 and a *y*-intercept of -2 is

[A] $y = 3x - 2$ [B] $x = 3y - 2$

[C] $y = -2x + 3$ [D] $y = -x$

[6] _____

7. What is the slope of the line whose equation is $2y = 5x + 4$?

[A] $\frac{5}{2}$ [B] 5 [C] 2 [D] $\frac{2}{5}$

[7] _____

8. What is the *y*-intercept of the graph of the line whose equation is $y = -\frac{2}{5}x + 4$?

[A] $-\frac{5}{2}$ [B] 0 [C] 4 [D] $-\frac{2}{5}$

[8] _____

9. If point (-1,0) is on the line whose equation is $y = 2x + b$, what is the value of *b*?

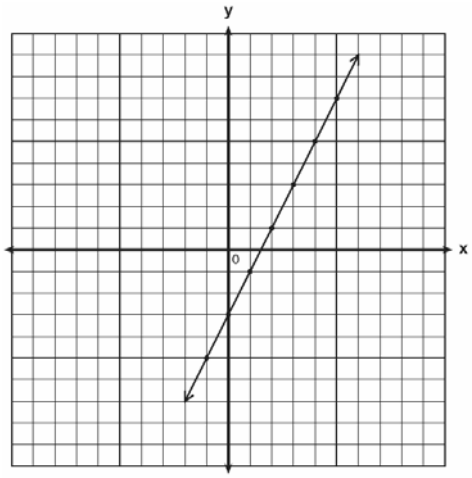
[A] 0 [B] 2 [C] 1 [D] 3

[9] _____

10. Line ℓ contains the points (0,4) and (2,0). Show that the point (-25,81) does or does not lie on line ℓ.

[10] _____

11. Write the equation for the line shown in the accompanying graph. Explain your answer.

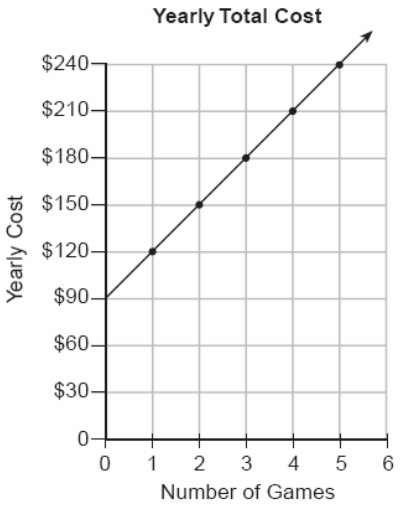


[11] _____

Lesson 6-3: Applying Linear Functions

Part 1: Interpreting Linear Functions

12. The accompanying graph represents the yearly cost of playing 0 to 5 games of golf at the Shadybrook Golf Course. What is the total cost of joining the club and playing 10 games during the year?



[12] _____

Lesson 6-4: Standard Form

Part 1: Graphing Equations Using Intercepts

13. The line $3x-2y=12$ has

[A] a slope of $\frac{3}{2}$ and a y-intercept of -6

[B] a slope of -3 and a y-intercept of -6

[C] a slope of $-\frac{3}{2}$ and a y-intercept of 6

[D] a slope of 3 and a y-intercept of -2

[13] _____

14. What is the slope of the line whose equation is $3x-4y-16=0$?

[A] $\frac{3}{4}$ [B] 3 [C] -4 [D] $\frac{4}{3}$

[14] _____

15. What is the slope of the linear equation $5y-10x=-15$?

[A] 2 [B] -10 [C] 10 [D] -15

[15] _____

16. The graph of the equation $x+3y=6$ intersects the y-axis at the point whose coordinates are

[A] (0,18) [B] (6,0)

[C] (0,2) [D] (0,6)

[16] _____

17. Point (k, -3) lies on the line whose equation is $x-2y=-2$. What is the value of k?

[A] 6 [B] 8 [C] -6 [D] -8

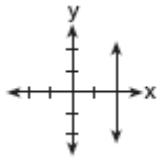
[17] _____

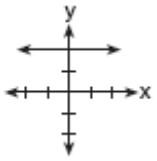
18. The graph of the equation $2x+6y=4$ passes through point $(x,-2)$. What is the value of x?

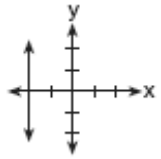
[A] 8 [B] 16 [C] 4 [D] -4

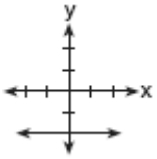
[18] _____

19. Which graph represents the equation $x = 2$?

[A] 

[B] 

[C] 

[D] 

[19] _____

20. Which statement describes the graph of $x = 4$?

[A] It passes through the point (0, 4).

[B] It is parallel to the *y*-axis.

[C] It is parallel to the *x*-axis.

[D] It has a slope of 4.

[20] _____

Lesson 6-6: Parallel and Perpendicular Lines

Part 1: Parallel Lines

21. Which equation represents a line parallel to the line $y = 2x - 5$?

[A] $y = -\frac{1}{2}x - 5$ [B] $y = 2x + 5$

[C] $y = 5x - 2$ [D] $y = -2x - 5$

[21] _____

22. Which equation represents a line that is parallel to the line whose equation is $2x + 3y = 12$?

[A] $6x + 4y = -2$ [B] $6y + 4x = 2$

[C] $4x - 6y = 2$ [D] $6y - 4x = 2$

[22] _____

23. Line *P* and line *C* lie on a coordinate plane and have equal slopes. Neither line crosses the second or third quadrant. Lines *P* and *C* must

[A] be perpendicular

[B] be vertical [C] be horizontal

[D] form an angle of 45°

[23] _____

24. Which properties best describe the coordinate graph of two distinct parallel lines?

[A] different slopes and different intercepts

[B] same slopes and same intercepts

[C] same slopes and different intercepts

[D] different slopes and same intercepts

[24] _____

25. If two lines are parallel and the slope of one of the lines is *m*, what is the product of their slopes?

[A] m^2 [B] 0 [C] 1 [D] $2m$

[25] _____

Part 2: Perpendicular Lines

26. Which equation represents a line that is perpendicular to the line whose equation is $-2y = 3x + 7$?

[A] $y = \frac{3}{2}x - 3$ [B] $y = x + 7$

[C] $2y = 3x - 3$ [D] $y = \frac{2}{3}x - 3$

[26] _____

27. Which line is perpendicular to the line whose equation is $5y+6=-3x$?

[A] $y=\frac{5}{3}x+7$ [B] $y=-\frac{3}{5}x+7$

[C] $y=-\frac{5}{3}x+7$ [D] $y=\frac{3}{5}x+7$

[27] _____

28. Which statement describes the lines whose equations are $y=\frac{1}{3}x+12$ and $6y=2x+6$?

[A] They intersect each other.

[B] They are perpendicular to each other.

[C] They are segments.

[D] They are parallel to each other.

[28] _____

29. Shanaya graphed the line represented by the equation $y=x-6$.
Write an equation for a line that is parallel to the given line.
Write an equation for a line that is perpendicular to the given line.
Write an equation for a line that is identical to the given line but has different coefficients.

[29] _____

30. If the product of x and $\frac{1}{m}$ is $-1, m\neq 0,$ then x is equivalent to

[A] $-\frac{1}{m}$ [B] m [C] $-m$ [D] $1-m$

[30] _____

Lesson 6-7: Scatter Plots and Equations of Lines

Part 2: Writing an Equation for a Line of Best Fit

31. The accompanying table shows the enrollment of a preschool from 1980 through 2000. Write a linear regression equation to model the data in the table.

Year (x)	Enrollment (y)
1980	14
1985	20
1990	22
1995	28
2000	37

[31] _____

32. The 1999 win-loss statistics for the American League East baseball teams on a particular date is shown in the accompanying chart.

	W	L
New York	52	34
Boston	49	39
Toronto	47	43
Tampa Bay	39	49
Baltimore	36	51

Find the mean for the number of wins, $\overline{W}$, and the mean for the number of losses, $\overline{L}$, and determine if the point $(\overline{W}, \overline{L})$ is a point on the line of best fit. Justify your answer.

[32] _____

33. A real estate agent plans to compare the price of a cottage, *y*, in a town on the seashore to the number of blocks, *x*, the cottage is from the beach. The accompanying table shows a random sample of sales and location data.
Write a linear regression equation that relates the price of a cottage to its distance from the beach.
Use the equation to predict the price of a cottage, to the *nearest dollar*, located three blocks from the beach.

Number of Blocks from the Beach (x)	Price of a Cottage (y)
5	$132,000
0	$310,000
4	$204,000
2	$238,000
1	$275,000
7	$60,800

[33] _____

34. The availability of leaded gasoline in New York State is decreasing, as shown in the accompanying table.

Year	1984	1988	1992	1996	2000
Gallons Available (in thousands)	150	124	104	76	50

Determine a linear relationship for *x* (years) versus *y* (gallons available), based on the data given. The data should be entered using the year and gallons available (in thousands), such as (1984,150).
If this relationship continues, determine the number of gallons of leaded gasoline available in New York State in the year 2005.
If this relationship continues, during what year will leaded gasoline first become unavailable in New York State?

[34] _____

35. The accompanying table illustrates the number of movie theaters showing a popular film and the film's weekly gross earnings, in millions of dollars.

Number of Theaters (x)	Gross Earnings (y) (millions of dollars)
443	2.57
455	2.65
493	3.73
530	4.05
569	4.76
657	4.76
723	5.15
1,064	9.35

Write the linear regression equation for this set of data, rounding values to *five decimal places.*
Using this linear regression equation, find the approximate gross earnings, in millions of dollars, generated by 610 theaters. Round your answer to *two decimal places.*
Find the minimum number of theaters that would generate at least 7.65 million dollars in gross earnings in one week.

[35] _____

36. In a mathematics class of ten students, the teacher wanted to determine how a homework grade influenced a student's performance on the subsequent test. The homework grade and subsequent test grade for each student are given in the accompanying table.

Homework Grade (x)	Test Grade (y)
94	98
95	94
92	95
87	89
82	85
80	78
75	73
65	67
50	45
20	40

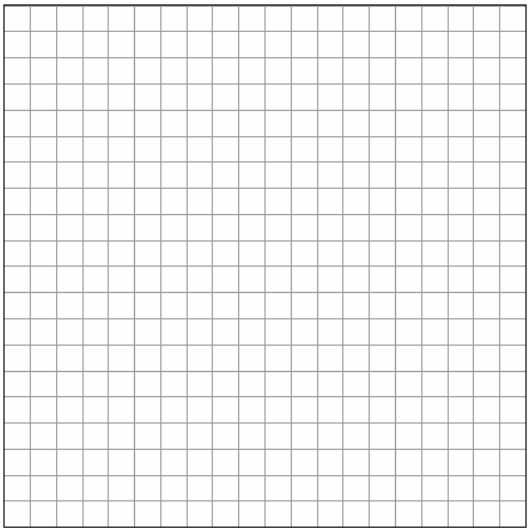
a Give the equation of the linear regression line for this set of data.
b A new student comes to the class and earns a homework grade of 78. Based on the equation in part *a*, what grade would the teacher predict the student would receive on the subsequent test, to the *nearest integer*?

[36] _____

37. The table below shows the results of an experiment that relates the height at which a ball is dropped, *x*, to the height of its first bounce, *y*.

Drop Height (x) (cm)	Bounce Height (y) (cm)
100	26
90	23
80	21
70	18
60	16

Find $\bar{x}$, the mean of the drop heights.
Find $\bar{y}$, the mean of the bounce heights.
Find the linear regression equation that best fits the data.
Show that $(\bar{x}, \bar{y})$ is a point on the line of regression. [The use of the grid is optional.]

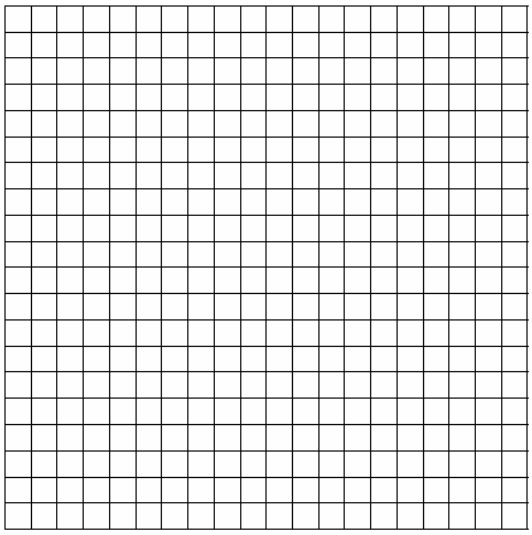


[37] _____

38. Two different tests were designed to measure understanding of a topic. The two tests were given to ten students with the following results:

Test *x*	75	78	88	92	95	67	58	72	74	81
Test *y*	81	73	85	88	89	73	66	75	70	78

Construct a scatter plot for these scores, and then write an equation for the line of best fit (round slope and intercept to the *nearest hundredth*).



Find the correlation coefficient.
Predict the score, to the *nearest integer*, on test *y* for a student who scored 87 on test *x*.

[38] _____

39. Since 1990, fireworks usage nationwide has grown, as shown in the accompanying table, where *t* represents the number of years since 1990, and *p* represents the fireworks usage per year, in millions of pounds.

Number of Years Since 1990 (*t*)	**Fireworks Usage per Year, In Millions of Pounds (*p*)**
0	67.6
2	88.8
4	119.0
6	120.1
7	132.5
8	118.3
9	159.2
11	161.6

Find the equation of the linear regression model for this set of data, where *t* is the independent variable. Round values to *four decimal places*.
Using this equation, determine in what year fireworks usage would have reached 99 million pounds.
Based on this linear model, how many millions of pounds of fireworks would be used in the year 2008? Round your answer to the *nearest tenth*.

[39] _____

40. A factory is producing and stockpiling metal sheets to be shipped to an automobile manufacturing plant. The factory ships only when there is a minimum of 2,050 sheets in stock. The accompanying table shows the day, x, and the number of sheets in stock, $f(x)$.

Day (x)	Sheets in Stock ($f(x)$)
1	860
2	930
3	1000
4	1150
5	1200
6	1360

Write the linear regression equation for this set of data, rounding the coefficients to *four decimal places*.
Use this equation to determine the day the sheets will be shipped.

[40] _____

41. A linear regression equation of best fit between a student's attendance and the degree of success in school is $h = 0.5x + 68.5$. The correlation coefficient, r, for these data would be

[A] $0 < r < 1$ [B] $-1 < r < 0$

[C] $r = 0$ [D] $r = -1$

[41] _____

42. The relationship of a woman's shoe size and length of a woman's foot, in inches, is given in the accompanying table.

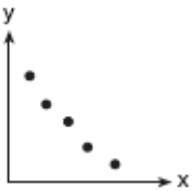
Woman's Shoe Size	5	6	7	8
Foot Length (in)	9.00	9.25	9.50	9.75

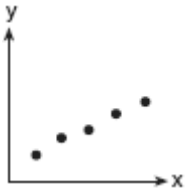
The linear correlation coefficient for this relationship is

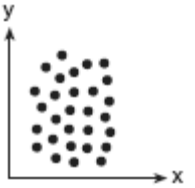
[A] 0 [B] -1 [C] 1 [D] 0.5

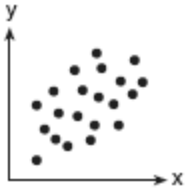
[42] _____

43. Which scatter diagram shows the strongest positive correlation?

[A] 

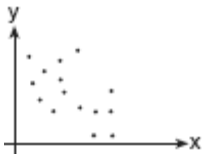
[B] 

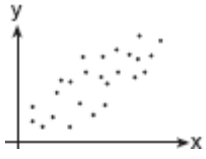
[C] 

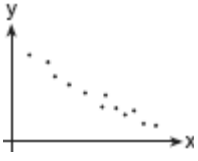
[D] 

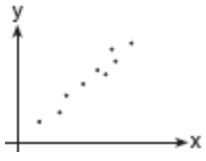
[43] _____

44. Which graph represents data used in a linear regression that produces a correlation coefficient closest to -1?

[A] 

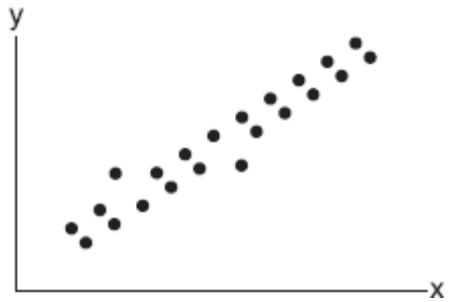
[B] 

[C] 

[D] 

[44] _____

45. What could be the approximate value of the correlation coefficient for the accompanying scatter plot?



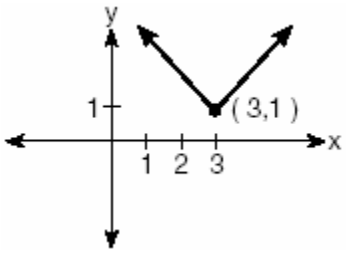
[A] -0.85 [B] -0.16 [C] 0.90 [D] 0.21

[45] _____

Lesson 6-8: Graphing Absolute Value Equations

Part 1: Translating Graphs of Absolute Value Equations

46. Which equation is represented by the accompanying graph?

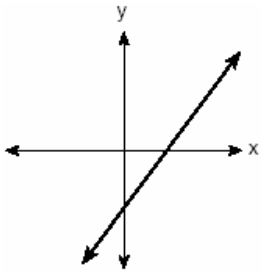


[A] $y = |x+3|-1$ [B] $y = |x-3|+1$

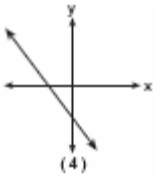
[C] $y = |x|-3$ [D] $y = (x-3)^2+1$

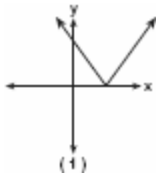
[46] _____

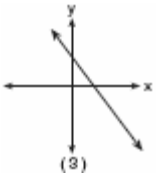
47. The graph below represents $f(x)$.

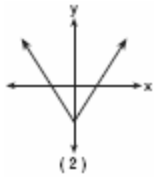


Which graph best represents $|f(x)|$?

[A] 

[B] 

[C] 

[D] 

[47] _____

Lesson 7-1: Solving Systems by Graphing

Part 1: Solving Systems by Graphing

1. When solved graphically, which system of equations will have exactly one point of intersection?

[A] $y = -x + 15$, $y = -x + 25$

[B] $y = -x - 20$, $y = x + 17$

[C] $y = 0.5x + 30$, $y = 0.5x - 30$

[D] $y = \frac{3}{5}x + 12$, $y = 0.6x - 19$

[1] _____

Lesson 7-3: Solving Systems Using Elimination

Part 1: Adding or Subtracting to Solve Systems

2. Which ordered pair is the solution of the following system of equations?

$$3x + 2y = 4$$
$$-2x + 2y = 24$$

[A] (-4,-8) [B] (2,-1)

[C] (2,-5) [D] (-4,8)

[2] _____

3. What point is the intersection of the graphs of the lines $2x - y = 3$ and $x + y = 3$?

[A] (2, 1) [B] (1, 2)

[C] (3, 3) [D] (3, 0)

[3] _____

4. Which ordered pair satisfies the system of equations below?

$$3x - y = 8$$
$$x + y = 2$$

[A] (5, -3) [B] (3, -1)

[C] (2.5, 0.5) [D] (2.5, -0.5)

[4] _____

5. What is the value of y in the following system of equations?

$$2x + 3y = 6$$
$$2x + y = -2$$

[A] 1 [B] 4 [C] -3 [D] 2

[5] _____

Lesson 7-4: Applications of Linear Systems

Part 1: Writing Systems of Linear Equations

6. Tanisha and Rachel had lunch at the mall. Tanisha ordered three slices of pizza and two colas. Rachel ordered two slices of pizza and three colas. Tanisha's bill was $6.00, and Rachel's bill was $5.25. What was the price of one slice of pizza? What was the price of one cola?

[6] _____

7. When Tony received his weekly allowance, he decided to purchase candy bars for all his friends. Tony bought three Milk Chocolate bars and four Creamy Nougat bars, which cost a total of $4.25 without tax. Then he realized this candy would not be enough for all his friends, so he returned to the store and bought an additional six Milk Chocolate bars and four Creamy Nougat bars, which cost a total of $6.50 without tax. How much did *each* type of candy bar cost?

[7] _____

8. Alexandra purchases two doughnuts and three cookies at a doughnut shop and is charged $3.30. Briana purchases five doughnuts and two cookies at the same shop for $4.95. All the doughnuts have the same price and all the cookies have the same price. Find the cost of one doughnut and find the cost of one cookie.

[8] _____

9. Ramón rented a sprayer and a generator. On his first job, he used each piece of equipment for 6 hours at a total cost of $90. On his second job, he used the sprayer for 4 hours and the generator for 8 hours at a total cost of $100. What was the hourly cost of *each* piece of equipment?

[9] _____

10. Three times as many robins as cardinals visited a bird feeder. If a total of 20 robins and cardinals visited the feeder, how many were robins?

[A] 5 [B] 20 [C] 15 [D] 10

[10] _____

11. Sal keeps quarters, nickels, and dimes in his change jar. He has a total of 52 coins. He has three more quarters than dimes and five fewer nickels than dimes. How many dimes does Sal have?

[A] 20 [B] 18 [C] 13 [D] 21

[11] _____

12. At a concert, $720 was collected for hot dogs, hamburgers, and soft drinks. All three items sold for $1.00 each. Twice as many hot dogs were sold as hamburgers. Three times as many soft drinks were sold as hamburgers. The number of soft drinks sold was

[A] 480 [B] 240 [C] 360 [D] 120

[12] _____

13. Seth has one less than twice the number of compact discs (CDs) that Jason has. Raoul has 53 more CDs than Jason has. If Seth gives Jason 25 CDs, Seth and Jason will have the same number of CDs. How many CDs did *each* of the three boys have to begin with?

[13] _____

14. A group of 148 people is spending five days at a summer camp. The cook ordered 12 pounds of food for each adult and 9 pounds of food for each child. A total of 1,410 pounds of food was ordered.
a Write an equation or a system of equations that describes the above situation and define your variables.
b Using your work from part *a*, find:
(1) the total number of adults in the group
(2) the total number of children in the group

[14] _____

15. Arielle has a collection of grasshoppers and crickets. She has 561 insects in all. The number of grasshoppers is twice the number of crickets. Find the number of *each* type of insect that she has.

[15] _____

16. Mary and Amy had a total of 20 yards of material from which to make costumes. Mary used three times more material to make her costume than Amy used, and 2 yards of material was not used. How many yards of materials did Amy use for her costume?

[16] _____

17. Ben had twice as many nickels as dimes. Altogether, Ben had $4.20. How many nickels *and* how many dimes did Ben have?

[17] _____

18. Using only 32-cent and 20-cent stamps, Charlie put $3.36 postage on a package he sent to his sister. He used twice as many 32-cent stamps as 20-cent stamps. Determine how many of *each* type of stamp he used.

[18] _____

19. The owner of a movie theater was counting the money from 1 day's ticket sales. He knew that a total of 150 tickets were sold. Adult tickets cost $7.50 each and children's tickets cost $4.75 each. If the total receipts for the day were $891.25, how many of *each* kind of ticket were sold?

[19] _____

20. There were 100 more balcony tickets than main-floor tickets sold for a concert. The balcony tickets sold for $4 and the main-floor tickets sold for $12. The total amount of sales for both types of tickets was $3,056.
a Write an equation or a system of equations that describes the given situation. Define the variables.
b Find the number of balcony tickets that were sold.

[20] _____

21. The ninth graders at a high school are raising money by selling T-shirts and baseball caps. The number of T-shirts sold was three times the number of caps. The profit they received for each T-shirt sold was $5.00, and the profit on each cap was $2.50. If the students made a total profit of $210, how many T-shirts *and* how many caps were sold?

[21] _____

22. The tickets for a dance recital cost $5.00 for adults and $2.00 for children. If the total number of tickets sold was 295 and the total amount collected was $1,220, how many adult tickets were sold? [Only an algebraic solution can receive full credit.]

[22] _____

23. A ribbon 56 centimeters long is cut into two pieces. One of the pieces is three times longer than the other. Find the lengths, in centimeters, of both pieces of ribbon.

[23] _____

24. Sharu has $2.35 in nickels and dimes. If he has a total of thirty-two coins, how many of *each* coin does he have?

[24] _____

25. The ratio of Tariq's telephone bill to Pria's telephone bill was 7:5. Tariq's bill was $14 more than Pria's bill. What was Tariq's bill?

[A] $28 [B] $21 [C] $49 [D] $35

[25] _____

26. Two numbers are in the ratio 2:5. If 6 is subtracted from their sum, the result is 50. What is the larger number?

[A] 40 [B] 55 [C] 35 [D] 45

[26] _____

27. Jamie is 5 years older than her sister Amy. If the sum of their ages is 19, how old is Jamie?

[A] 14 [B] 12 [C] 7 [D] 5

[27] _____

28. A total of 600 tickets were sold for a concert. Twice as many tickets were sold in advance than were sold at the door. If the tickets sold in advance cost $25 each and the tickets sold at the door cost $32 each, how much money was collected for the concert?

[28] _____

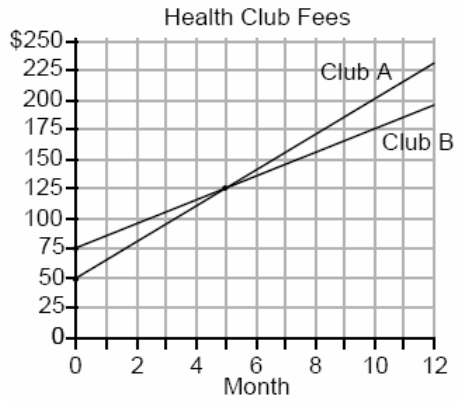
29. At the local video rental store, José rents two movies and three games for a total of $15.50. At the same time, Meg rents three movies and one game for a total of $12.05. How much money is needed to rent a combination of one game and one movie?

[29] _____

30. The cost of a long-distance telephone call is determined by a flat fee for the first 5 minutes and a fixed amount for each additional minute. If a 15-minute telephone call costs $3.25 and a 23-minute call costs $5.17, find the cost of a 30-minute call.

[30] _____

31. Two health clubs offer different membership plans. The graph below represents the total cost of belonging to Club *A* and Club *B* for one year.



a If the yearly cost includes a membership fee plus a monthly charge, what is the membership fee for Club *A*?

b (1) What is the number of the month when the total cost is the same for both clubs?

(2) What is the total cost for Club *A* when both plans are the same?

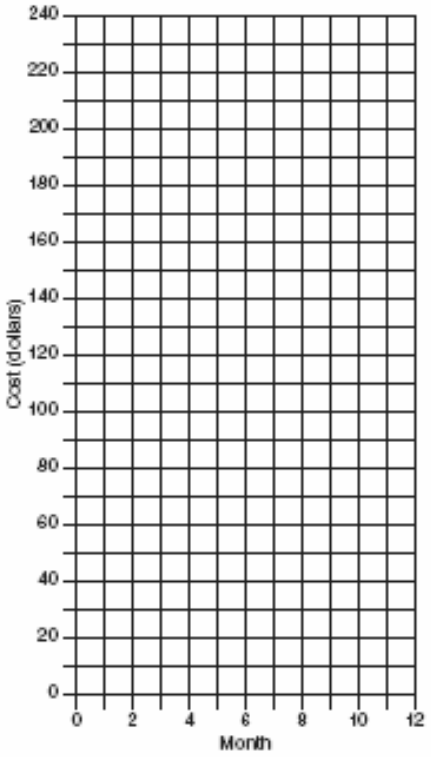
c What is the monthly charge for Club *B*?

[31] _____

32. The Eye Surgery Institute just purchased a new laser machine for $500,000 to use during eye surgery. The Institute must pay the inventor $550 each time the machine is used. If the Institute charges $2,000 for each laser surgery, what is the *minimum* number of surgeries that must be performed in order for the Institute to make a profit?

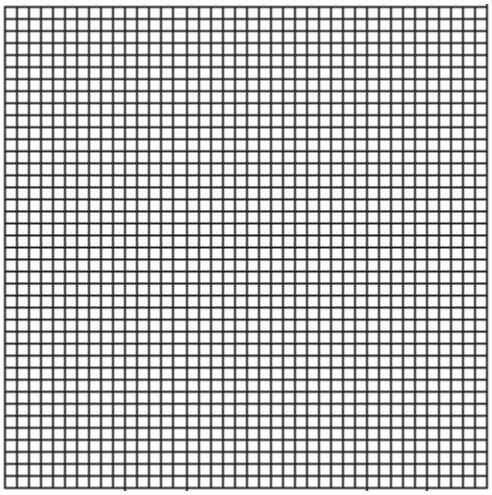
[32] _____

33. At Ron's Rental, a person can rent a big-screen television for $10 a month plus a one-time "wear-and-tear" fee of $100. At Josie's Rental, the charge is $20 a month and an additional charge of $20 for delivery with no "wear-and-tear" fee.
a If *c* equals the cost, write one equation representing the cost of the rental for *m* months at Ron's Rental and one equation representing the cost of the rental for *m* months at Josie's Rental.
b On the accompanying grid, graph and label each equation.
c From your graph, determine in which month Josie's cost will equal Ron's cost.



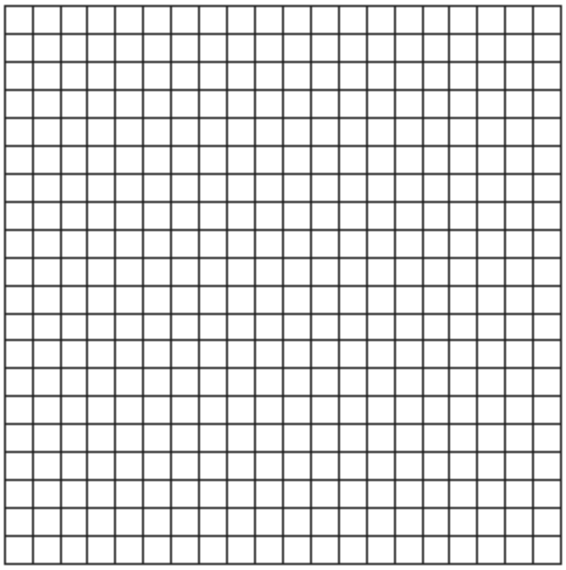
[33] _____

34. The senior class is sponsoring a dance. The cost of a student disk jockey is $40, and tickets sell for $2 each. Write a linear equation and, on the accompanying grid, graph the equation to represent the relationship between the number of tickets sold and the profit from the dance. Then find how many tickets must be sold to break even.



[34] _____

35. Currently, Tyrone has $60 and his sister has $135. Both get an allowance of $5 each week. Tyrone decides to save his entire allowance, but his sister spends all of hers each week plus an additional $10 each week. After how many weeks will they each have the same amount of money?
[The use of the grid is optional.]



[35] _____

36. Juan has a cellular phone that costs $12.95 per month plus 25¢ per minute for each call. Tiffany has a cellular phone that costs $14.95 per month plus 15¢ per minute for each call. For what number of minutes do the two plans cost the same?

[36] _____

37. A hotel charges $20 for the use of its dining room and $2.50 a plate for each dinner. An association gives a dinner and charges $3 a plate but invites four nonpaying guests. If each person has one plate, how many paying persons must attend for the association to collect the exact amount needed to pay the hotel?

[A] 44 [B] 60 [C] 20 [D] 40

[37] _____

38. The Excel Cable Company has a monthly fee of $32.00 and an additional charge of $8.00 for each premium channel. The Best Cable Company has a monthly fee of $26.00 and additional charge of $10.00 for each premium channel. The Horton family is deciding which of these two cable companies to subscribe to.
a For what number of premium channels will the total monthly subscription fee for the Excel and Best Cable companies be the same?
b The Horton family decides to subscribe to 2 premium channels for a period of one year.
(1) Which cable company should they subscribe to in order to spend less money?
(2) How much money will the Hortons save in one year by using the less expensive company?

[38] _____

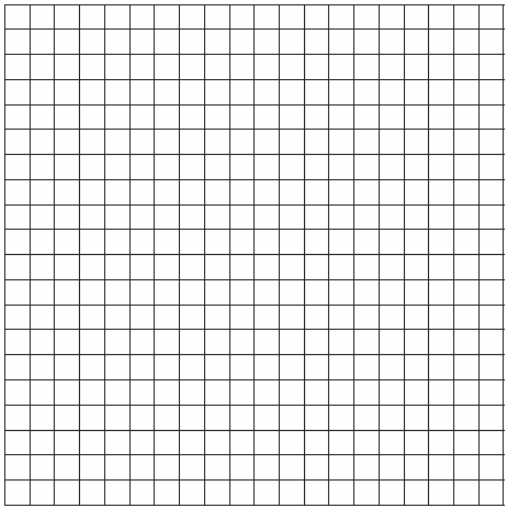
39. A cellular telephone company has two plans. Plan *A* charges $11 a month and $0.21 per minute. Plan *B* charges $20 a month and $0.10 per minute. After how much time, to the *nearest minute*, will the cost of plan *A* be equal to the cost of plan *B*?

[A] 81 hr 48 min [B] 1 hr 36 min

[C] 81 hr 8 min [D] 1 hr 22 m

[39] _____

40. Island Rent-a-Car charges a car rental fee of $40 plus $5 per hour or fraction of an hour. Wayne's Wheels charges a car rental fee of $25 plus $7.50 per hour or fraction of an hour. Under what conditions does it cost *less* to rent from Island Rent-a-Car? [The use of the accompanying grid is optional.]



[40] _____

Lesson 7-5: Linear Inequalities

Part 1: Graphing Linear Inequalities

41. In the graph of $y \leq -x$, which quadrant is completely shaded?

[A] IV [B] II [C] III [D] I

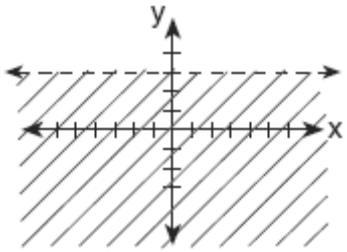
[41] _____

42. Which ordered pair is not in the solution set of $y > 2x + 1$?

[A] (1,4) [B] (3,8) [C] (1,6) [D] (2,5)

[42] _____

43. Which inequality is represented by the accompanying graph?



[A] $y > 3$ [B] $y < 3$

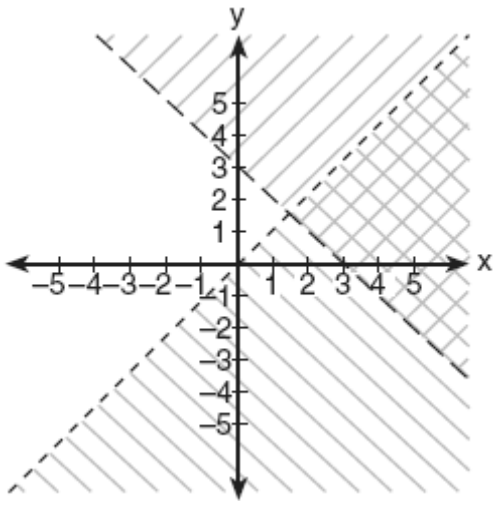
[C] $y \leq 3$ [D] $y \geq 3$

[43] _____

Lesson 7-6: Systems of Linear Inequalities

Part 1: Solving Systems of Linear Inequalities by Graphing

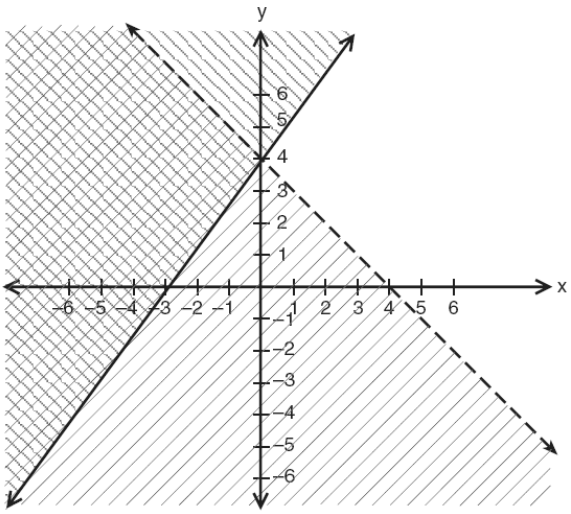
44. Which ordered pair is in the solution set of the system of inequalities shown in the accompanying graph?



[A] (1,5) [B] (0,1) [C] (0,0) [D] (3,2)

[44] _____

45. Which point is in the solution set of the system of inequalities shown in the accompanying graph?

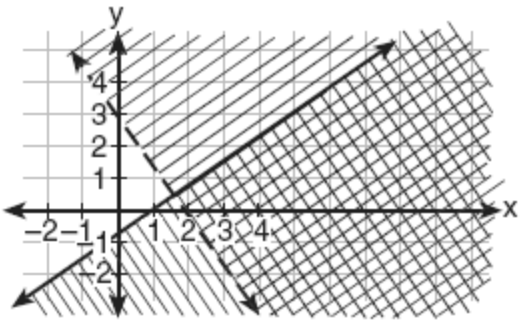


[A] (4, -1) [B] (-4, 1)

[C] (0, 4) [D] (2, 4)

[45] _____

46. Which coordinate point is in the solution set for the system of inequalities shown in the accompanying graph?



[A] (1,-1) [B] (0,1)

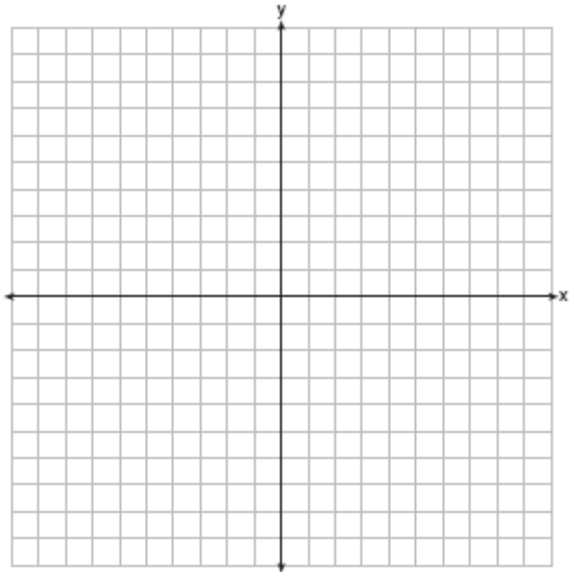
[C] (3,1) [D] (2,2)

[46] _____

47. Graph the following systems of inequalities on the accompanying set of axes and label the solution set *S*:

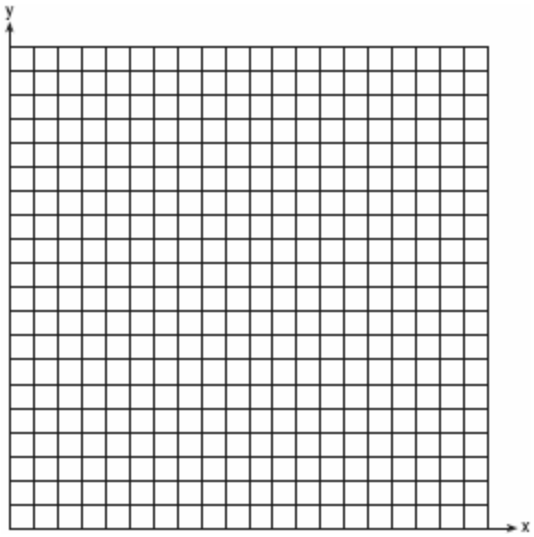
$$y > x - 4$$
$$y + x \geq 2$$

[Only a graphic solution can receive full credit.]



[47] _____

48. A company manufactures bicycles and skateboards. The company's daily production of bicycles cannot exceed 10, and its daily production of skateboards must be less than or equal to 12. The combined number of bicycles and skateboards cannot be more than 16. If *x* is the number of bicycles and *y* is the number of skateboards, graph on the accompanying set of axes the region that contains the number of bicycles and skateboards the company can manufacture daily.



[48] _____

Lesson 8-1: Zero and Negative Exponents

Part 1: Zero and Negative Exponents

1. What is the value of 3^{-2}?

   [A] $\frac{1}{9}$ [B] -9 [C] 9 [D] $-\frac{1}{9}$

   [1] _____

2. What is the value of 2^{-3}?

   [A] $\frac{1}{6}$ [B] -6 [C] -8 [D] $\frac{1}{8}$

   [2] _____

3. What is the value of $3^0 + 3^{-2}$?

   [A] 0 [B] $1\frac{1}{9}$ [C] 6 [D] $\frac{1}{9}$

   [3] _____

4. Which expression is equaivalent to $x^{-1} \cdot y^2$?

   [A] xy^{-2} [B] $\frac{x}{y^2}$ [C] $\frac{y^2}{x}$ [D] xy^2

   [4] _____

5. Which expression is equivalent to x^{-4}?

   [A] $-4x$ [B] $\frac{1}{x^4}$ [C] x^4 [D] 0

   [5] _____

Lesson 8-2: Scientific Notation

Part 1: Writing Numbers in Scientific and Standard Notation

6. Expressed in decimal notation, 4.726×10^{-3} is

   [A] 4,726 [B] 0.004726

   [C] 472.6 [D] 0.04726

   [6] _____

7. The number 8.375×10^{-3} is equivalent to

   [A] 8,375 [B] 0.008375

   [C] 0.0008375 [D] 0.08375

   [7] _____

8. The number 1.56×10^{-2} is equivalent to

   [A] 0.00156 [B] 0.156

   [C] 0.0156 [D] 156

   [8] _____

9. The expression 0.62×10^3 is equivalent to

   [A] 6.2×10^2 [B] 62,000

   [C] 0.062 [D] 6.2×10^4

   [9] _____

10. Which expression is equivalent to 6.02×10^{23}?

    [A] 60.2×10^{21} [B] 6020×10^{21}

    [C] 602×10^{21} [D] 0.602×10^{21}

    [10] _____

11. According to the 2000 census, the population of New York State was approximately 18,900,000. How is this number expressed in scientific notation?

[A] 1890×10^{4} [B] 1.89×10^{7}

[C] 18.9×10^{6} [D] 189×10^{5}

[11] _____

12. The distance from Earth to the Sun is approximately 93 million miles. A scientist would write that number as

[A] 93×10^{7} [B] 93×10^{10}

[C] 9.3×10^{6} [D] 9.3×10^{7}

[12] _____

13. A micron is a unit used to measure specimens viewed with a microscope. One micron is equivalent to 0.00003937 inch. How is this number expressed in scientific notation?

[A] 3937×10^{-8} [B] 3.937×10^{5}

[C] 3937×10^{8} [D] 3.937×10^{-5}

[13] _____

14. The approximate number of seconds in a year is 32,000,000. When this number is written in scientific notation, the numerical value of the exponent is

[A] -7 [B] 6 [C] 8 [D] 7

[14] _____

15. The mass of an orchid seed is approximately 0.0000035 gram. Written in scientific notation, that mass is equivalent to 3.5×10^{n}. What is the value of *n*?

[A] -6 [B] -7 [C] -5 [D] -8

[15] _____

16. The size of a certain type of molecule is 0.00009078 inch. If this number is expressed as 9.078×10^{n}, what is the value of *n*?

[A] -5 [B] 8 [C] -8 [D] 5

[16] _____

17. If 0.0347 is written by a scientist in the form 3.47×10^{n}, the value of *n* is

[A] 2 [B] -2 [C] 3 [D] -3

[17] _____

Part 2: Using Scientific Notation

18. What is the sum of 6×10^{3} and 3×10^{2}?

[A] 6.3×10^{3} [B] 9×10^{6}

[C] 9×10^{5} [D] 18×10^{5}

[18] _____

19. If the number of molecules in 1 mole of a substance is 6.02×10^{23}, then the number of molecules in 100 moles is

[A] 6.02×10^{22} [B] 6.02×10^{24}

[C] 6.02×10^{21} [D] 6.02×10^{25}

[19] _____

20. If the mass of a proton is 1.67×10^{-24} gram, what is the mass of 1,000 protons?

[A] 1.67×10^{-27} [B] 1.67×10^{-21}

[C] 1.67×10^{-23} [D] 1.67×10^{-22}

[20] _____

21. The distance from Earth to the imaginary planet Med is 1.7×10^7 miles. If a spaceship is capable of traveling 1,420 miles per hour, how many days will it take the spaceship to reach the planet Med? Round your answer to the *nearest day*.

[21] _____

Lesson 8-3: Multiplication Properties of Exponents

Part 1: Multiplying

22. The expression $8^{-4}\cdot8^6$ is equivalent to

[A] 8^{-2} [B] 8^{-24} [C] 8^{10} [D] 8^2

[22] _____

23. The expression $3^2\cdot3^3\cdot3^4$ is equivalent to

[A] 3^9 [B] 27^{24} [C] 3^{24} [D] 27^9

[23] _____

24. The expression $2^3\cdot4^2$ is equivalent to

[A] 2^7 [B] 8^5 [C] 2^{12} [D] 8^6

[24] _____

25. The expression $(x^2z^3)(xy^2z)$ is equivalent to

[A] $x^3y^2z^4$ [B] $x^2y^2z^3$

[C] $x^4y^2z^5$ [D] $x^3y^3z^4$

[25] _____

26. The product of $2x^3$ and $6x^5$ is

[A] $10x^{15}$ [B] $12x^8$

[C] $12x^{15}$ [D] $10x^8$

[26] _____

27. The product of $3x^2y$ and $-4xy^3$ is

[A] $12x^2y^3$ [B] $-12x^3y^4$

[C] $12x^3y^4$ [D] $-12x^2y^3$

[27] _____

28. The product of $3x^5$ and $2x^4$ is

[A] $6x^{20}$ [B] $5x^{20}$ [C] $6x^9$ [D] $5x^9$

[28] _____

29. The product of $4x^2y$ and $2xy^3$ is

[A] $8x^2y^3$ [B] $8x^3y^4$

[C] $8x^2y^4$ [D] $8x^3y^3$

[29] _____

30. What is the product of $10x^4y^2$ and $3xy^3$?

[A] $30x^5y^6$ [B] $30x^4y^6$

[C] $30x^4y^5$ [D] $30x^5y^5$

[30] _____

31. What is the product of $\frac{1}{3}x^2y$ and $\frac{1}{6}xy^3$?

[A] $\frac{1}{9}x^3y^4$ [B] $\frac{1}{18}x^3y^4$

[C] $\frac{1}{2}x^2y^3$ [D] $\frac{1}{18}x^2y^3$

[31] _____

Lesson 8-4: More Multiplication Properties of Exponents

Part 2: Raising a Product to a Power

32. The expression $(6x^3y^6)^2$ is equivalent to

[A] $36x^5y^8$ [B] $12x^6y^{12}$

[C] $36x^6y^{12}$ [D] $6x^6y^{12}$

[32] _____

33. Expressed in its simplest form, $(3x^3)(2y)^2(4x^4)$ is equivalent to

[A] $24x^{12}y^2$ [B] $48x^7y^2$

[C] $48x^{12}y^2$ [D] $24x^7y^2$

[33] _____

34. The product of $(5ab)$ and $(-2a^2b)^3$ is

[A] $-40a^6b^4$ [B] $-30a^7b^4$

[C] $-30a^6b^4$ [D] $-40a^7b^4$

[34] _____

Lesson 8-5: Division Properties of Exponents

Part 1: Dividing Powers with the Same Base

35. When $-9x^5$ is divided by $-3x^3$, $x \neq 0$, the quotient is

[A] $27x^8$ [B] $-3x^2$

[C] $-27x^{15}$ [D] $3x^2$

[35] _____

36. The quotient of $-\frac{15x^8}{5x^2}$, $x \neq 0$, is

[A] $-3x^4$ [B] $-10x^4$

[C] $-10x^6$ [D] $-3x^6$

[36] _____

37. The expression $\frac{-32x^8}{4x^2}$, $x \neq 0$, is equivalent to

[A] $-8x^6$ [B] $8x^4$

[C] $8x^6$ [D] $-8x^4$

[37] _____

38. If $x \neq 0$, then $\frac{(x^2)^3}{x^5} \cdot 1000$ is equivalent to

[A] $1000x$ [B] 1000

[C] 0 [D] $1000 + x$

[38] _____

39. The expression $\frac{5x^6y^2}{x^8y}$ is equivalent to

[A] $\frac{5y}{x^2}$ [B] $5x^2y$

[C] $5x^{14}y^3$ [D] $\frac{5y^3}{x^{14}}$

[39] _____

40. The expression $\frac{(b^{2n+1})^3}{b^n \cdot b^{4n+3}}$ is equivalent to

[A] b^{-3n} [B] $\frac{b^n}{2}$ [C] b^{-3n+1} [D] b^n

[40] _____

41. If 3.85×10^{6} is divided by 385×10^{4}, the result is

[A] 0.01 [B] 1

[C] 3.85×10^{4} [D] 3.85×10^{10}

[41] _____

42. What is the value of $\frac{6.3\times10^{8}}{3\times10^{4}}$ in scientific notation?

[A] 2.1×10^{2} [B] 2.1×10^{-4}

[C] 2.1×10^{4} [D] 2.1×10^{-2}

[42] _____

43. Two objects are 2.4×10^{20} centimeters apart. A message from one object travels to the other at a rate of 1.2×10^{5} centimeters per second. How many seconds does it take the message to travel from one object to the other?

[A] 2.88×10^{25} [B] 2.0×10^{4}

[C] 1.2×10^{15} [D] 2.0×10^{15}

[43] _____

Lesson 8-7: Exponential Functions

Part 1: Evaluating Exponential Functions

44. Which equation models the data in the accompanying table?

Time in hours, x	0	1	2	3	4	5	6
Population, y	5	10	20	40	80	160	320

[A] $y=2x+5$ [B] $y=2x$

[C] $y=2^{x}$ [D] $y=5(2^{x})$

[44] _____

45. What is the domain of $f(x)=2^{x}$?

[A] $x\geq0$ [B] all real numbers

[C] all integers [D] $x\leq0$

[45] _____

46. A population of wolves in a county is represented by the equation $P(t)=80(0.98)^{t}$, where t is the number of years since 1998. Predict the number of wolves in the population in the year 2008.

[46] _____

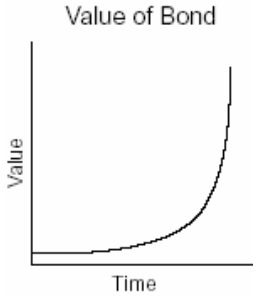
47. The height, f(x), of a bouncing ball after x bounces is represented by $f(x)=80(0.5)^{x}$. How many times higher is the first bounce than the fourth bounce?

[A] 8 [B] 2 [C] 16 [D] 4

[47] _____

Part 2: Graphing Exponential Functions

48. The accompanying graph represents the value of a bond over time.



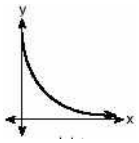
Which type of function does this graph best model?

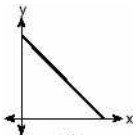
[A] quadratic [B] exponential

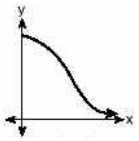
[C] logarithmic [D] trigonometric

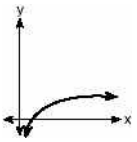
[48] _____

49. The strength of a medication over time is represented by the equation $y = 200(1.5)^{-x}$, where x represents the number of hours since the medication was taken and y represents the number of micrograms per millimeter left in the blood. Which graph best represents this relationship?

[A] 

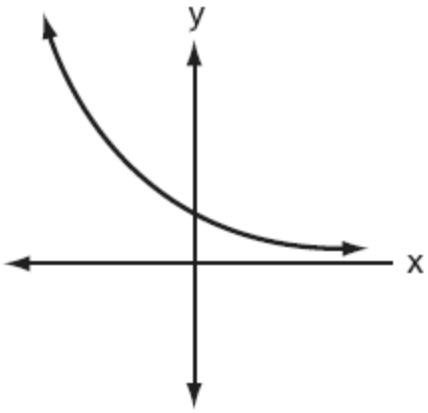
[B] 

[C] 

[D] 

[49] _____

50. Which equation best represents the accompanying graph?



[A] $y = -2^x$ [B] $y = 2^x$

[C] $y = x^2 + 2$ [D] $y = 2^{-x}$

[50] _____

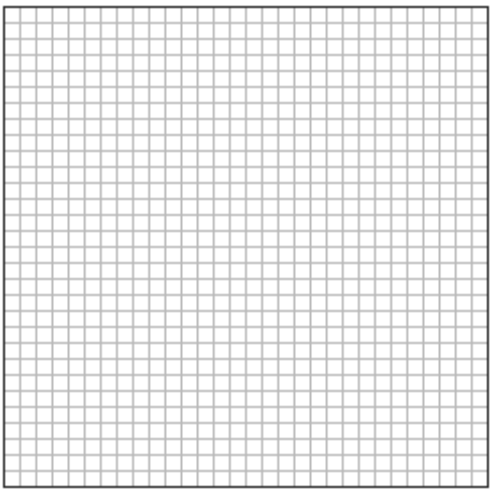
51. The graphs of the equations $y = 2^x$ and $y = -2x + a$ intersect in Quadrant I for which values of a?

[A] $0 < a < 1$ [B] $a \geq 1$

[C] $a > 1$ [D] $a < 1$

[51] _____

52. On the accompanying grid, sketch the graphs of $y = 2^x$ and $3y = 7x + 3$ over the interval $-3 \leq x \leq 4$. Identify and state the coordinates of all points of intersection.

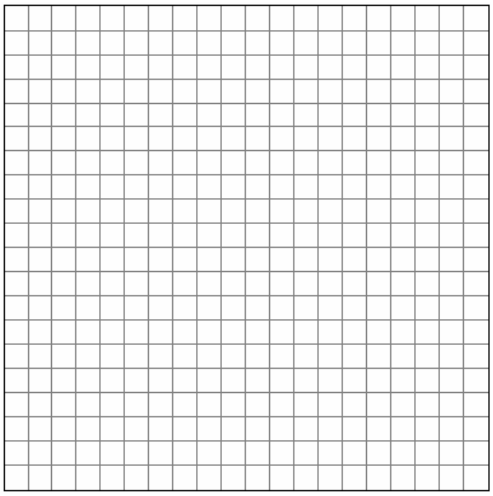


[52] _____

53. On the accompanying grid, solve the following system of equations graphically:

$y = -x^2 + 2x + 1$

$y = 2^x$



[53] _____

Activity Lab P. 474: Fitting Exponential Curves to Data

54. A box containing 1,000 coins is shaken, and the coins are emptied onto a table. Only the coins that land heads up are returned to the box, and then the process is repeated. The accompanying table shows the number of trials and the number of coins returned to the box after each trial.

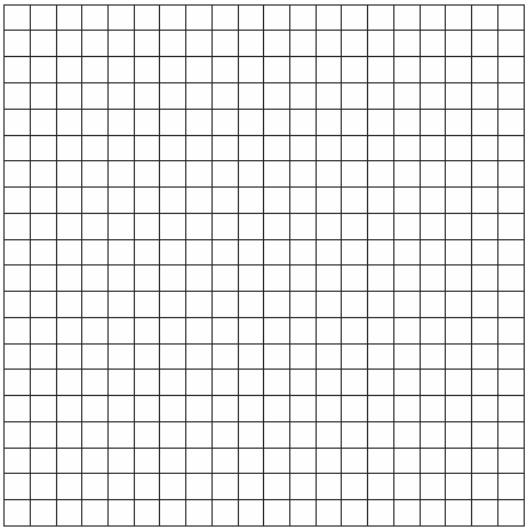
Trial	0	1	3	4	6
Coins Returned	1,000	610	220	132	45

Write an exponential regression equation, rounding the calculated values to the *nearest ten-thousandth.*
Use the equation to predict how many coins would be returned to the box after the eighth trial.

[54] _____

55. The table below, created in 1996, shows a history of transit fares from 1955 to 1995. On the accompanying grid, construct a scatter plot where the independent variable is years. State the exponential regression equation with the coefficient and base rounded to the *nearest thousandth*. Using this equation, determine the prediction that should have been made for the year 1998, to the *nearest cent.*

Year	Fare ($)
55	0.10
60	0.15
65	0.20
70	0.30
75	0.40
80	0.60
85	0.80
90	1.15
95	1.50

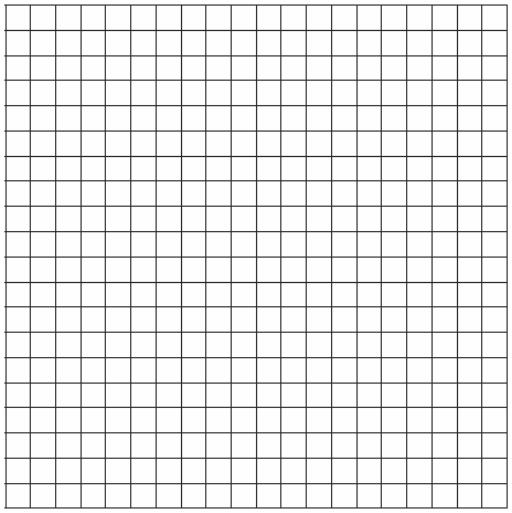


[55] _____

56. The breaking strength, *y*, in tons, of steel cable with diameter *d*, in inches, is given in the table below.

d (in)	*y* (tons)
0.50	9.85
0.75	21.80
1.00	38.30
1.25	59.20
1.50	84.40
1.75	114.00

On the accompanying grid, make a scatter plot of these data. Write the exponential regression equation, expressing the regression coefficients to the *nearest tenth.*

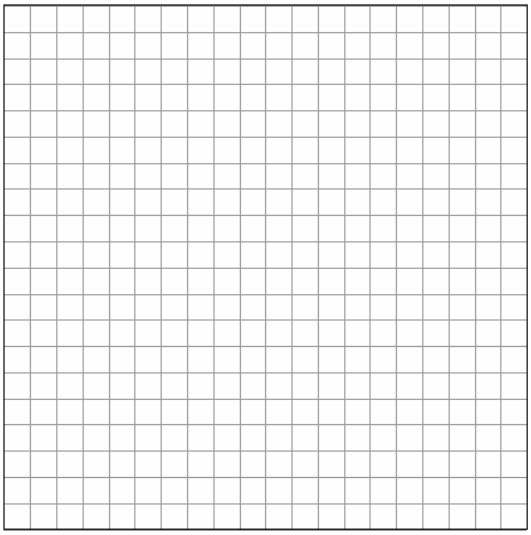


[56] _____

57. The accompanying table shows the average salary of baseball players since 1984. Using the data in the table, create a scatter plot on the grid and state the exponential regression equation with the coefficient and base rounded to the *nearest hundredth.*
Using your written regression equation, estimate the salary of a baseball player in the year 2005, to the *nearest thousand dollars.*

Baseball Players' Salaries

Numbers of Years Since 1984	Average Salary (thousands of dollars)
0	290
1	320
2	400
3	495
4	600
5	700
6	820
7	1,000
8	1,250
9	1,580



[57] _____

58. Jean invested $380 in stocks. Over the next 5 years, the value of her investment grew, as shown in the accompanying table.

Years Since Investment (x)	Value of Stock, in Dollars (y)
0	380
1	395
2	411
3	427
4	445
5	462

Write the exponential regression equation for this set of data, rounding all values to *two decimal places.*
Using this equation, find the value of her stock, to the *nearest dollar*, 10 years after her initial purchase.

[58] _____

Lesson 8-8: Exponential Growth and Decay

Part 1: Exponential Growth

59. On January 1, 1999, the price of gasoline was $1.39 per gallon. If the price of gasoline increased by 0.5% per month, what was the cost of one gallon of gasoline, to the *nearest cent*, on January 1 one year later?

[59] _____

60. The Franklins inherited $3,500, which they want to invest for their child's future college expenses. If they invest it at 8.25% with interest compounded monthly, determine the value of the account, in dollars, after 5 years.
Use the formula $A = P(1+\frac{r}{n})^{nt}$, where A = value of the investment after t years, P = principal invested, r = annual interest rate, and n = number of times compounded per year.

[60] _____

Part 2: Exponential Decay

61. A used car was purchased in July 1999 for $11,900. If the car depreciates 13% of its value each year, what is the value of the car, to the *nearest hundred dollar*s, in July 2002?

[61] _____

Lesson 9-1: Adding and Subtracting Polynomials

Part 2: Adding and Subtracting Polynomials

1. The sum of $3x^2 + x + 8$ and $x^2 - 9$ can be expressed as

   [A] $4x^2 + x - 17$ [B] $3x^4 + x - 1$

   [C] $4x^4 + x - 1$ [D] $4x^2 + x - 1$

   [1] _____

2. The sum of $3x^2 + 4x - 2$ and $x^2 - 5x + 3$ is

   [A] $4x^2 + x - 1$ [B] $4x^2 + x + 1$

   [C] $4x^2 - x + 1$ [D] $4x^2 - x - 1$

   [2] _____

3. The expression $(3x^2 + 2xy + 7) - (6x^2 - 4xy + 3)$ is equivalent to

   [A] $3x^2 - 6xy - 4$ [B] $-3x^2 - 2xy + 4$

   [C] $3x^2 - 2xy + 4$ [D] $-3x^2 + 6xy + 4$

   [3] _____

4. The expression $(2x^2 + 6x + 5) - (6x^2 + 3x + 5)$ is equivalent to

   [A] $-4x^2 + 3x$ [B] $-4x^2 - 3x + 10$

   [C] $4x^2 - 3x$ [D] $4x^2 + 3x - 10$

   [4] _____

5. The expression $(x^2 - 5x - 2) - (-6x^2 - 7x - 3)$ is equivalent to

   [A] $7x^2 - 12x - 5$ [B] $7x^2 + 2x + 1$

   [C] $7x^2 - 2x + 1$ [D] $7x^2 + 2x - 5$

   [5] _____

6. When $3a^2 - 2a + 5$ is subtracted from $a^2 + a - 1$, the result is

   [A] $-2a^2 + 3a - 6$ [B] $-2a^2 + 3a + 6$

   [C] $2a^2 - 3a - 6$ [D] $2a^2 - 3a + 6$

   [6] _____

7. If $2x^2 - 4x + 6$ is subtracted from $5x^2 + 8x - 2$, the difference is

   [A] $3x^2 + 4x + 4$ [B] $3x^2 + 12x - 8$

   [C] $-3x^2 + 4x + 4$ [D] $-3x^2 - 12x + 8$

   [7] _____

8. When $3x^2 - 2x + 1$ is subtracted from $2x^2 + 7x + 5$, the result will be

   [A] $-x^2 + 5x + 6$ [B] $-x^2 + 9x + 4$

   [C] $x^2 - 9x - 4$ [D] $x^2 + 5x + 6$

   [8] _____

9. When $-2x^2 + 4x + 2$ is subtracted from $x^2 + 6x - 4$, the result is

   [A] $2x^2 - 2x - 6$ [B] $-x^2 + 10x - 2$

   [C] $-3x^2 - 2x + 6$ [D] $3x^2 + 2x - 6$

   [9] _____

10. If $2x^2 - x + 6$ is subtracted from $x^2 + 3x - 2$, the result is

    [A] $-x^2 + 2x - 8$ [B] $-x^2 + 4x - 8$

    [C] $x^2 - 4x + 8$ [D] $x^2 + 2x - 8$

    [10] _____

11. When $3x^2 - 8x$ is subtracted from $2x^2 + 3x$, the difference is

[A] $x^2 - 5x$ [B] $-x^2 - 11x$

[C] $-x^2 + 11x$ [D] $-x^2 - 5x$

[11] _____

12. When $3a^2 - 7a + 6$ is subtracted from $4a^2 - 3a + 4$, the result is

[A] $7a^2 - 10a + 10$ [B] $a^2 + 4a - 2$

[C] $-a^2 - 4a + 2$ [D] $a^2 - 10a - 2$

[12] _____

13. Subtract $5x^2 - 7x - 6$ from $9x^2 + 3x - 4$.

[13] _____

Lesson 9-2: Multiplying and Factoring

Part 2: Factoring a Monomial from a Polynomial

14. If $3x$ is one factor of $3x^2 - 9x$, what is the other factor?

[A] $x - 3$ [B] $x^2 - 6x$

[C] $3x$ [D] $x + 3$

[14] _____

15. If one factor of $56x^4y^3 - 42x^2y^6$ is $14x^2y^3$, what is the other factor?

[A] $4x^2 - 3y^2$ [B] $4x^2 - 3y^3$

[C] $4x^2y - 3xy^2$ [D] $4x^2y - 3xy^3$

[15] _____

Lesson 9-3: Multiplying Binomials

Part 1: Multiplying Two Binomials

16. What is the product of $(c + 8)$ and $(c - 5)$?

[A] $c^2 - 3c - 40$ [B] $c^2 + 13c - 40$

[C] $c^2 - 40$ [D] $c^2 + 3c - 40$

[16] _____

Lesson 9-4: Multiplying Special Cases

Part 1: Finding the Square of a Binomial

17. The expression $(x - 6)^2$ is equivalent to

[A] $x^2 - 36$ [B] $x^2 + 12x + 36$

[C] $x^2 - 12x + 36$ [D] $x^2 + 36$

[17] _____

18. The expression $(a^2 + b^2)^2$ is equivalent to

[A] $a^4 + 4a^2b^2 + b^4$ [B] $a^4 + a^2b^2 + b^4$

[C] $a^4 + b^4$ [D] $a^4 + 2a^2b^2 + b^4$

[18] _____

Lesson 9-5: Factoring Trinomials of the Type x^2+bx+c

Part 1: Factoring Trinomials

19. Which expression is a factor of $x^2 + 2x - 15$

[A] $(x - 3)$ [B] $(x + 15)$

[C] $(x - 5)$ [D] $(x + 3)$

[19] _____

20. Which expression is a factor of $n^2+3n-54$?

[A] n^2+9 [B] $n-9$

[C] $n+6$ [D] $n+9$

[20] _____

21. What are the factors of $x^2-10x-24$?

[A] $(x + 12)(x - 2)$ [B] $(x - 4)(x - 6)$

[C] $(x - 4)(x + 6)$ [D] $(x - 12)(x + 2)$

[21] _____

Lesson 9-6: Factoring Trinomials of the Type ax^2+bx+c

Part 1: Factoring ax^2+bx+c

22. Factored completely, the expression $2y^2+12y-54$ is equivalent to

[A] $(y + 6)(2y - 9)$ [B] $(2y + 6)(y - 9)$

[C] $2(y - 3)(y - 9)$ [D] $2(y + 9)(y - 3)$

[22] _____

23. Factor completely: $3x^2+15x-42$

[23] _____

Lesson 9-7: Factoring Special Cases

Part 2: Factoring the Difference of Squares

24. What is a common factor of x^2-9 and x^2-5x+6?

[A] x^2 [B] $x-2$

[C] $x+3$ [D] $x-3$

[24] _____

25. One of the factors of $4x^2-9$ is

[A] $(x - 3)$ [B] $(4x - 3)$

[C] $(2x + 3)$ [D] $(x + 3)$

[25] _____

26. Expressed in factored form, the binomial $4a^2-9b^2$ is equivalent to

[A] $(2a - 9b)(2a + b)$ [B] $(4a - 3b)(a + 3b)$

[C] $(2a - 3b)(2a - 3b)$

[D] $(2a + 3b)(2a - 3b)$

[26] _____

27. Factor completely: $3x^2-27$

[A] $(3x+3)(x-9)$ [B] $3(x+3)(x-3)$

[C] $3(x^2-27)$ [D] $3(x-3)^2$

[27] _____

28. Written in simplest factored form, the binomial $2x^2-50$ can be expressed as

[A] $2(x - 5)(x + 5)$ [B] $2x(x - 50)$

[C] $(x - 5)(x + 5)$ [D] $2(x- 5)(x - 5)$

[28] _____

29. Factor completely: $5n^2-80$

[29] _____

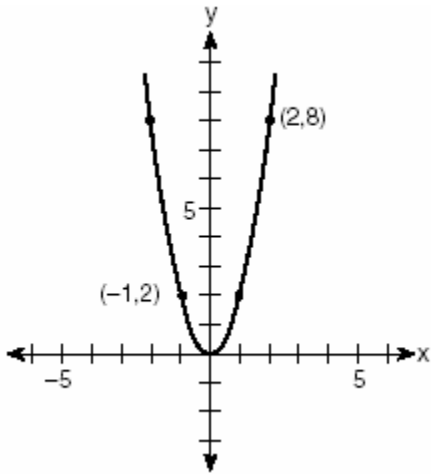
30. Factor completely: $3ax^2-27a$

[30] _____

Lesson 10-1: Exploring Quadratic Graphs

Part 1: Graphing $y=ax^2$

1. Which quadratic function is shown in the accompanying graph?



[A] $y = -\frac{1}{2}x^2$ [B] $y = \frac{1}{2}x^2$

[C] $y = -2x^2$ [D] $y = 2x^2$

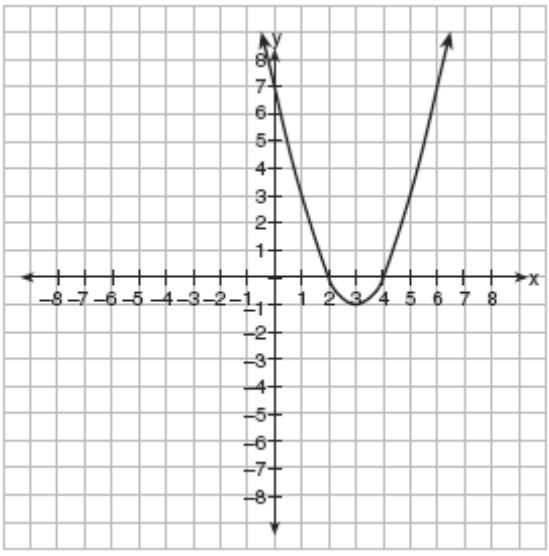
[1] _____

2. What is the total number of points of intersection for the graphs of the equations $y = x^2$ and $y = -x^2$?

[A] 1 [B] 2 [C] 0 [D] 3

[2] _____

3. Which is an equation of the line of symmetry for the parabola in the accompanying diagram?



[A] $x = 4$ [B] $x = 3$

[C] $y = 3$ [D] $x = 2$

[3] _____

4. For which quadratic equation is the axis of symmetry $x = 3$?

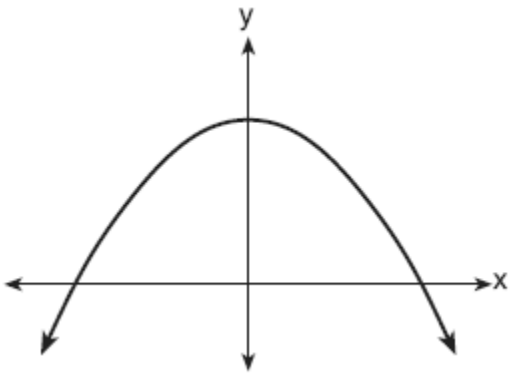
[A] $y = -x^2 + 6x + 2$ [B] $y = x^2 + x + 3$

[C] $y = x^2 + 6x + 3$ [D] $y = -x^2 + 3x + 5$

[4] _____

Part 1: Graphing $y=ax^2+c$

5. Which equation is best represented by the accompanying graph?



[A] $y = 6x + 1$ [B] $y = 6x^2$

[C] $y = -x^2 + 1$ [D] $y = 6^x$

[5] _____

6. What is one solution of the accompanying system of equations?

$$y = -x^2 + 5$$
$$y = -0.5x^2 + 3$$

[A] (-2,1) [B] (0,5)

[C] (0,3) [D] (3,5)

[6] _____

Lesson 10-2: Quadratic Functions

Part 1: Graphing $y=ax^2+bx+c$

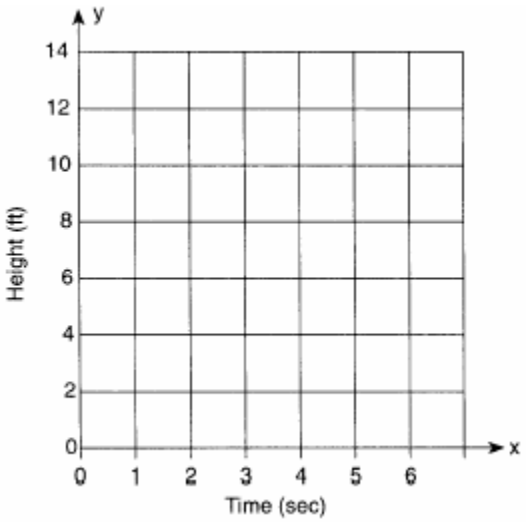
7. The height of a golf ball hit into the air is modeled by the equation $h = -16t^2 + 48t$, where h represents the height, in feet, and t represents the number of seconds that have passed since the ball was hit. What is the height of the ball after 2 seconds?

[A] 64 ft [B] 80 ft [C] 32 ft [D] 16 ft

[7] _____

8. Amy tossed a ball in the air in such a way that the path of the ball was modeled by the equation $y = -x^2 + 6x$. In the equation, y represents the height of the ball in feet and x is the time in seconds.

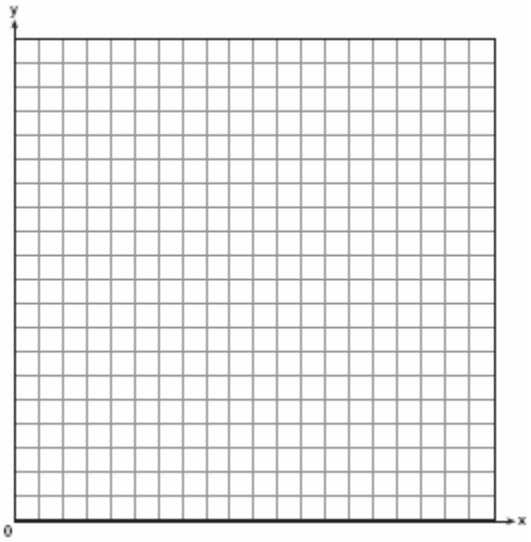
a Graph $y = -x^2 + 6x$ for $0 \le x \le 6$ on the grid provided below.



b At what time, x, is the ball at its highest point?

[8] _____

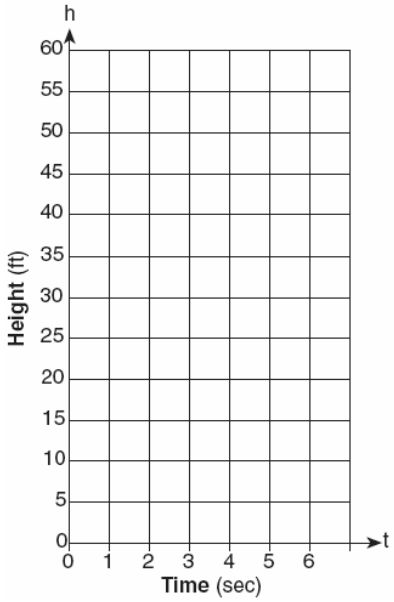
9. An architect is designing a museum entranceway in the shape of a parabolic arch represented by the equation $y = -x^2 + 20x$, where $0 \le x \le 20$ and all dimensions are expressed in feet. On the accompanying set of axes, sketch a graph of the arch and determine its maximum height, in feet.



[9] _____

10. Tom throws a ball into the air. The ball travels on a parabolic path represented by the equation $h = -8t^2 + 40t$, where *h* is the height, in feet, and *t* is the time, in seconds.

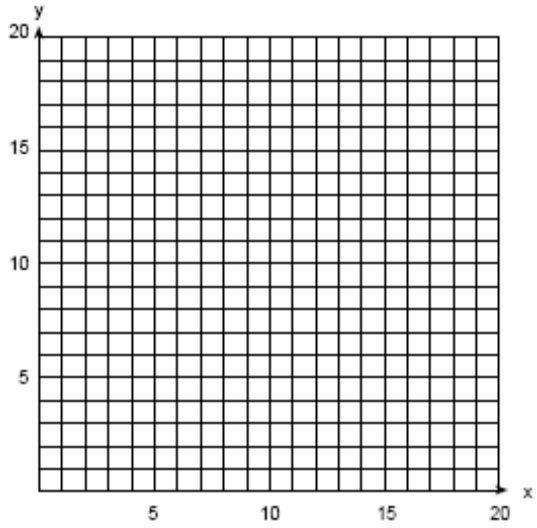
a On the accompanying set of axes, graph the equation from *t*= 0 to *t* = 5 seconds, including all integral values of *t* from 0 to 5.



b What is the value of *t* at which *h* has its greatest value?

[10] _____

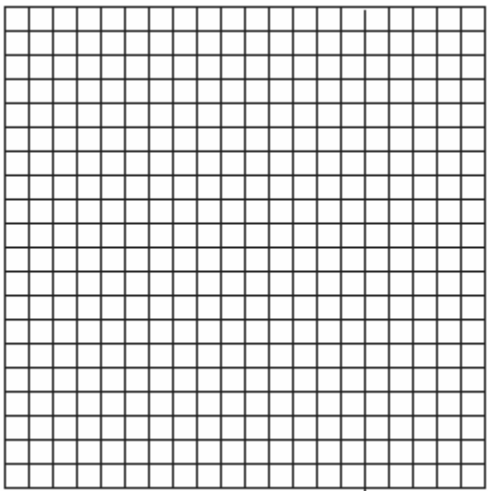
11. An arch is built so that it is 6 feet wide at the base. Its shape can be re presented by a parabola with the equation $y = -2x^2 + 12x$, where *y* is the height of the arch.
a Graph the parabola from $x = 0$ to $x = 6$ on the grid below.



b Determine the maximum height, *y*, of the arch.

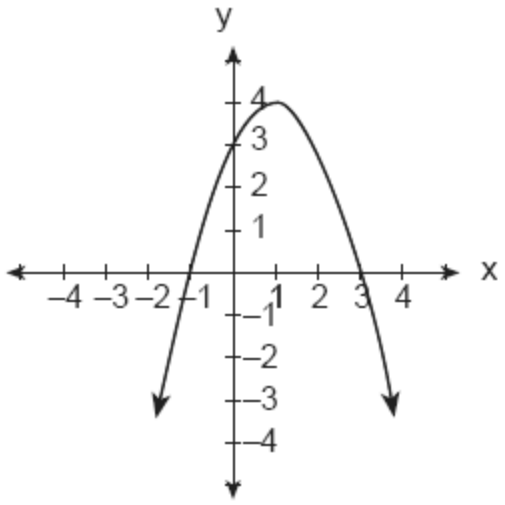
[11] _____

12. A small rocket is launched from a height of 72 feet. The height of the rocket in feet, *h*, is represented by the equation $h(t) = -16t^2 + 64t + 72$, where *t* = time, in seconds. Graph this equation on the accompanying grid.
Use your graph to determine the number of seconds that the rocket will remain at or above 100 feet from the ground. [Only a graphic solution can receive full credit.]



[12] _____

13. Which is an equation of the parabola shown in the accompanying diagram?

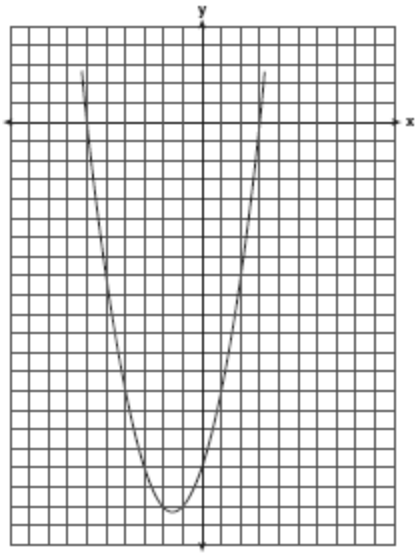


[A] $y = -x^2 + 2x + 3$ [B] $y = -x^2 - 2x + 3$

[C] $y = x^2 - 2x + 3$ [D] $y = x^2 + 2x + 3$

[13] _____

14. The graph of a quadratic equation is shown in the accompanying diagram. The scale on the axes is a unit scale. Write an equation of this graph in standard form.



[14] _____

15. An archer shoots an arrow into the air such that its height at any time, *t*, is given by the function $h(t) = -16t^2 + kt + 3$. If the maximum height of the arrow occurs at time $t = 4$, what is the value of *k*?

[A] 64 [B] 4 [C] 8 [D] 128

[15] _____

16. What is the turning point, or vertex, of the parabola whose equation is $y = 3x^2 + 6x - 1$?

[A] (3,44) [B] (1,8)

[C] (-3,8) [D] (-l,-4)

[16] _____

17. What is the minimum point of the graph of the equation $y = 2x^2 + 8x + 9$?

[A] (2,17) [B] (-2,-15)

[C] (-2,1) [D] (2,33)

[17] _____

18. The height of an object, *h(t)*, is determined by the formula $h(t) = -16t^2 + 256t$, where *t* is time, in seconds. Will the object reach a maximum or a minimum? Explain or show your reasoning.

[18] _____

19. Vanessa throws a tennis ball in the air. The function $h(t) = -16t^2 + 45t + 7$ represents the distance, in feet, that the ball is from the ground at any time *t*. At what time, to the *nearest tenth of a second*, is the ball at its maximum height?

[19] _____

20. The height, *h*, in feet, a ball will reach when thrown in the air is a function of time, *t*, in seconds, given by the equation $h(t) = -16t^2 + 30t + 6$. Find, to the *nearest tenth*, the maximum height, in feet, the ball will reach.

[20] _____

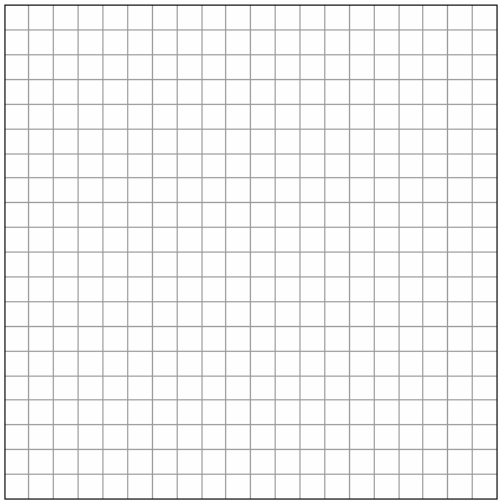
21. When a current, *I*, flows through a given electrical circuit, the power, *W*, of the circuit can be determined by the formula $W = 120I - 12I^2$. What amount of current, *I*, supplies the maximum power, *W*?

[21] _____

22. The equation $W = 120I - 12I^2$ represents the power (*W*), in watts, of a 120-volt circuit having a resistance of 12 ohms when a current (*I*) is flowing through the circuit. What is the maximum power, in watts, that can be delivered in this circuit?

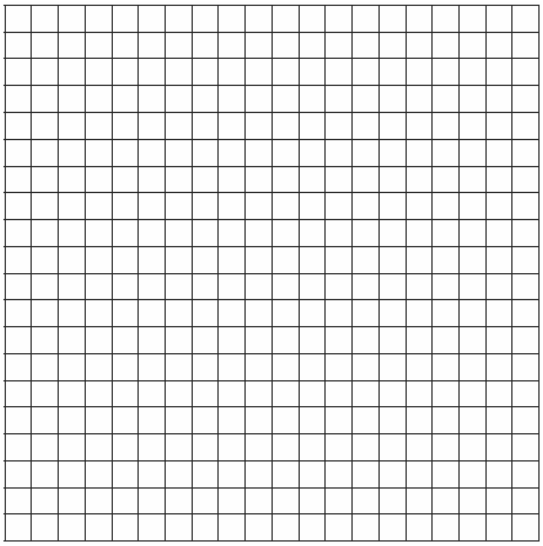
[22] _____

23. A baseball player throws a ball from the outfield toward home plate. The ball's height above the ground is modeled by the equation $y = -16x^2 + 48x + 6$ where *y* represents height, in feet, and *x* represents time, in seconds. The ball is initially thrown from a height of 6 feet.
How many seconds after the ball is thrown will it again be 6 feet above the ground?
What is the maximum height, in feet, that the ball reaches? [The use of the accompanying grid is optional.]



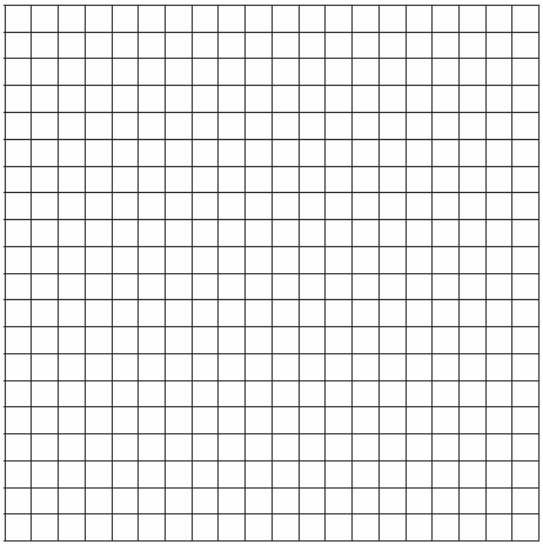
[23] _____

24. A rock is thrown vertically from the ground with a velocity of 24 meters per second, and it reaches a height of $2 + 24t - 4.9t^2$ after t seconds. How many seconds after the rock is thrown will it reach maximum height, and what is the maximum height the rock will reach, in meters? How many seconds after the rock is thrown will it hit the ground? Round your answers to the *nearest hundredth.* [Only an algebraic or graphic solution will be accepted.]



[24] _____

25. The path of a rocket fired during a fireworks display is given by the equation $s(t) = 64t - 16t^2$, where t is the time, in seconds, and s is the height, in feet. What is the maximum height, in feet, the rocket will reach? In how many seconds will the rocket hit the ground? [The grid is optional.]

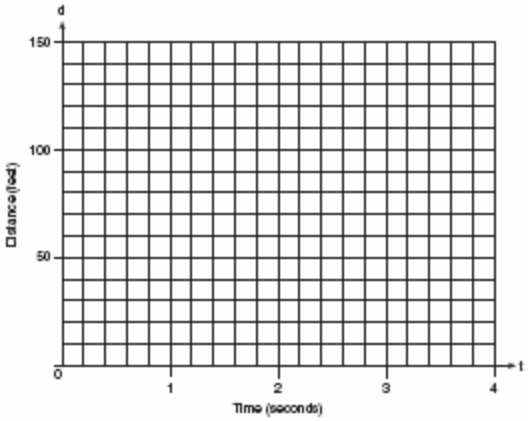


[25] _____

Lesson 10-3: Solving Quadratic Equations

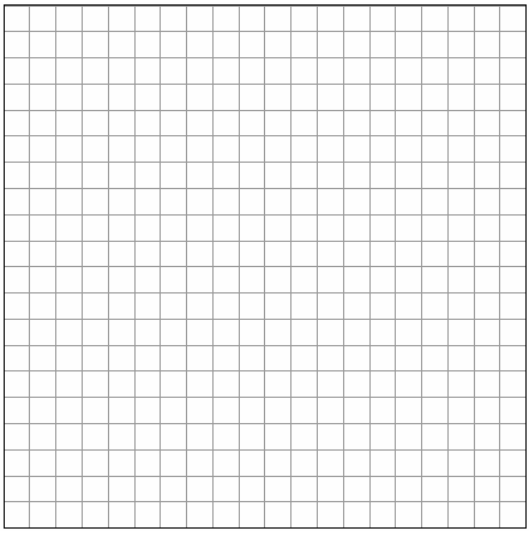
Part 1: Solving Quadratic Equations by Graphing

26. Greg is in a car at the top of a roller-coaster ride. The distance, *d*, of the car from the ground as the car descends is determined by the equation $d = 144 - 16t^2$, where *t* is the number of seconds it takes the car to travel down to each point on the ride. How many seconds will it take Greg to reach the ground?
For an algebraic solution show your work here.
For a graphic solution show your work here.



[26] _____

27. An acorn falls from the branch of a tree to the ground 25 feet below. The distance, *S*, the acorn is from the ground as it falls is represented by the equation $S(t) = -16t^2 + 25$, where *t* represents time, in seconds. Sketch a graph of this situation on the accompanying grid.
Calculate, to the *nearest hundredth of a second*, the time the acorn will take to reach the ground.



[27] _____

Part 2: Solving Quadratic Equations Using Square Roots

28. What is the solution set of the equation $3x^2 = 48$?

[A] {4,-4} [B] {2,8}

[C] {-2,-8} [D] {4,4}

[28] _____

Lesson 10-4: Factoring to Solve Quadratic Equations

Part 1: Solving Quadratic Equations

29. The larger root of the equation $(x+4)(x-3)=0$ is

[A] -3 [B] 4 [C] 3 [D] -4

[29] _____

30. One of the roots of the equation $x^2+3x-18=0$ is 3. What is the other root?

[A] 6 [B] 15 [C] -21 [D] -6

[30] _____

31. What is the solution set of the equation $x^2-5x=0$?

[A] {0} [B] {0,5} [C] {0,-5} [D] {5}

[31] _____

32. The solution set for the equation $x^2-2x-15=0$ is

[A] {5,-3} [B] {5,3}

[C] {-5,3} [D] {-5,-3}

[32] _____

33. The solution set of the equation $x^2-4x-12=0$ is

[A] {-6,2} [B] {-3,4}

[C] {-2,6} [D] {-4,3}

[33] _____

34. What is the solution set of $m^2-3m-10=0$?

[A] {3,-10} [B] {5,-2}

[C] {2,-5} [D] {3,10}

[34] _____

35. What is the solution set of the equation $x^2-5x-24=0$?

[A] {3,-8} [B] {3,8}

[C] {-3,-8} [D] {-3,8}

[35] _____

36. What is the solution set for the equation $x^2-5x+6=0$

[A] {-6,1} [B] {6,-1}

[C] {2,3} [D] {-2,-3}

[36] _____

37. What is the solution set of the equation $x^2+11x+28=0$?

[A] {-7,-4} [B] {-3,-4}

[C] {-7,4} [D] {3,4}

[37] _____

38. Solve for *x*: $x^2+3x-40=0$

[38] _____

39. Solve for *x*: $x^2+3x-28=0$

[39] _____

40. Solve for *x*: $x^2+2x-24=0$

[40] _____

41. The solution set for the equation $x^2-5x=6$ is

[A] {2,-3} [B] {-2,3}

[C] {1,-6} [D] {-1,6}

[41] _____

42. If $(x - 4)$ is a factor of $x^2 - x - w = 0$, then the value of w is

[A] -3 [B] 3 [C] 12 [D] -12

[42] _____

43. When Albert flips open his mathematics textbook, he notices that the product of the page numbers of the two facing pages that he sees is 156. Which equation could be used to find the page numbers that Albert is looking at?

[A] $x(x+1) = 156$

[B] $(x+1) + (x+2) = 156$

[C] $(x+1)(x+3) = 156$

[D] $x + (x+1) = 156$

[43] _____

44. Three brothers have ages that are consecutive even integers. The product of the first and third boys' ages is 20 more than twice the second boy's age. Find the age of *each* of the three boys.

[44] _____

45. Tamara has two sisters. One of the sisters is 7 years older than Tamara. The other sister is 3 years younger than Tamara. The product of Tamara's sisters' ages is 24. How old is Tamara?

[45] _____

46. Find three consecutive odd integers such that the product of the first and the second exceeds the third by 8.

[46] _____

47. If the equation $x^2 - kx - 36 = 0$ has $x = 12$ as one root, what is the value of k?

[A] -3 [B] -9 [C] 3 [D] 9

[47] _____

48. One root of the equation $2x^2 - x - 15 = 0$ is

[A] -3 [B] 3 [C] $\frac{3}{2}$ [D] $\frac{5}{2}$

[48] _____

49. What is the solution set of the equation $3x^2 - 34x - 24 = 0$?

[A] $\{-12, \frac{2}{3}\}$ [B] $\{-\frac{2}{3}, 12\}$

[C] $\{-2, 6\}$ [D] $\{-6, 2\}$

[49] _____

50. A ball is thrown straight up at an initial velocity of 54 feet per second. The height of the ball t seconds after it is thrown is given by the formula $h(t) = 54t - 12t^2$. How many seconds after the ball is thrown will it return to the ground?

[A] 6 [B] 4 [C] 4.5 [D] 9.2

[50] _____

51. For which equation is the sum of the roots equal to the product of the roots?

[A] $x^2 - 8x - 4 = 0$ [B] $x^2 - 4x + 4 = 0$

[C] $x^2 + 3x - 6 = 0$ [D] $x^2 + x + 1 = 0$

[51] _____

Extension P. 577: Rational Exponents

52. The value of $\left(\frac{3^0}{27^{\frac{2}{3}}}\right)^{-1}$ is

[A] -9 [B] 9 [C] $-\frac{1}{9}$ [D] $\frac{1}{9}$

[52] _____

53. The expression $4^{\frac{1}{2}} \cdot 2^3$ is equal to

[A] 16 [B] $4^{\frac{3}{2}}$ [C] $8^{\frac{3}{2}}$ [D] 4

[53] _____

54. The expression $\frac{3^{\frac{1}{3}}}{3^{-\frac{2}{3}}}$ is equivalent to

[A] 1 [B] $\sqrt{3}$ [C] $\frac{1}{\sqrt[3]{3}}$ [D] 3

[54] _____

55. If x is a positive integer, $4x^{\frac{1}{2}}$ is equivalent to

[A] $\frac{2}{x}$ [B] $4\frac{1}{x}$ [C] $2x$ [D] $4\sqrt{x}$

[55] _____

56. The expression $b^{-\frac{3}{2}}, b > 0,$ is equivalent to

[A] $(\sqrt[3]{b})^2$ [B] $\frac{1}{(\sqrt[3]{b})^2}$

[C] $\frac{1}{(\sqrt{b})^3}$ [D] $-(\sqrt{b})^3$

[56] _____

57. The volume of a soap bubble is represented by the equation $V = 0.094\sqrt{A^3}$, where A represents the surface area of the bubble. Which expression is also equivalent to V?

[A] $0.094A^6$ [B] $0.094A^{\frac{3}{2}}$

[C] $(0.094A^3)^{\frac{1}{2}}$ [D] $0.094A^{\frac{2}{3}}$

[57] _____

58. The expression $\sqrt[4]{16a^6b^4}$ is equivalent to

[A] $2a^{\frac{3}{2}}b$ [B] $4a^{\frac{3}{2}}b$

[C] $4a^2b$ [D] $2a^2b$

[58] _____

59. When simplified, the expression $(\sqrt[3]{m^4})(m^{-\frac{1}{2}})$ is equivalent to

[A] $\sqrt[5]{m^{-4}}$ [B] $\sqrt[3]{m^{-2}}$

[C] $\sqrt[4]{m^3}$ [D] $\sqrt[6]{m^5}$

[59] _____

60. Find the value of $(x+2)^0 + (x+1)^{-\frac{2}{3}}$ when $x = 7$.

[60] _____

61. If $(a^x)^{\frac{2}{3}} = \frac{1}{a^2}$, what is the value of x?

[A] 2 [B] -1 [C] 1 [D] -3

[61] _____

62. If $f(x) = x^{-\frac{3}{2}}$, then $f(\frac{1}{4})$ is equal to

[A] -4 [B] $-\frac{1}{8}$ [C] -2 [D] 8

[62] _____

63. Meteorologists can determine how long a storm lasts by using the function $t(d) = 0.07d^{\frac{3}{2}}$, where *d* is the diameter of the storm, in miles, and *t* is the time, in hours. If the storm lasts 4.75 hours, find its diameter, to the *nearest tenth of a mile*.

[63] _____

Lesson 10-6: Using the Quadratic Formula

Part 1: Using the Quadratic Formula

64. If the sum of the roots of $x^2 + 3x - 5$ is added to the product of its roots, the result is

[A] -2 [B] 15 [C] -8 [D] -15

[64] _____

65. Matt's rectangular patio measures 9 feet by 12 feet. He wants to increase the patio's dimensions so its area will be twice the area it is now. He plans to increase both the length and the width by the same amount, *x*. Find *x*, to the *nearest hundredth of a foot*.

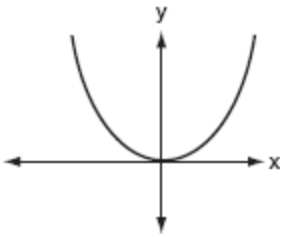
[65] _____

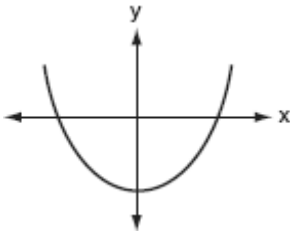
66. Barb pulled the plug in her bathtub and it started to drain. The amount of water in the bathtub as it drains is represented by the equation $L = -5t^2 - 8t + 120$, where *L* represents the number of liters of water in the bathtub and *t* represents the amount of time, in minutes, since the plug was pulled.
How many liters of water were in the bathtub when Barb pulled the plug? Show your reasoning.
Determine, to the *nearest tenth of a minute*, the amount of time it takes for all the water in the bathtub to drain.

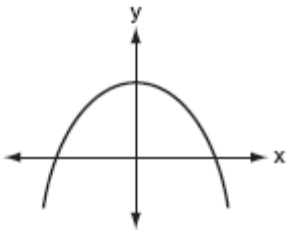
[66] _____

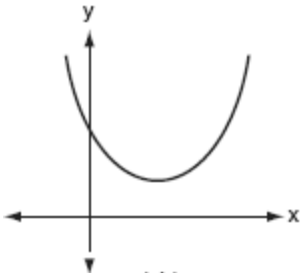
Lesson 10-7: Using the Discriminant

67. Which graph represents a quadratic function with a negative discriminant?

[A] 

[B] 

[C] 

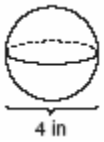
[D] 

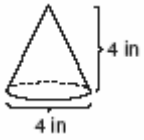
[67] _____

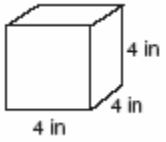
Activity Lab P. 612-613: Surface Area and Volumes

68. Which diagram represents the figure with the greatest volume?

[A] 

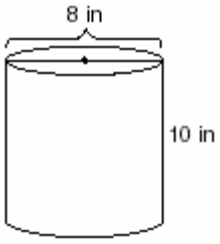
[B] 

[C] 

[D] 

[68] _____

69. A storage container in the shape of a right circular cylinder is shown in the accompanying diagram.



What is the volume of this container, to the *nearest hundredth*?

[A] 251.33 in^3 [B] 125.66 in^3

[C] 502.65 in^3 [D] 56.55 in^3

[69] _____

70. A cardboard box has length $x-2$, width $x+1$, and height $2x$.

a Write an expression, in terms of *x*, to represent the volume of the box.

b If $x = 8$ centimeters, what is the number of cubic centimeters in the volume of the box?

[70] _____

71. If the length of a rectangular prism is doubled, its width is tripled, and its height remains the same, what is the volume of the new rectangular prism?

[A] triple the original volume

[B] nine times the original volume

[C] six times the original volume

[D] double the original volume

[71] _____

72. A box in the shape of a cube has a volume of 64 cubic inches. What is the length of a side of the box?

[A] 16 *in* [B] 4 *in*

[C] 8 *in* [D] $21.\overline{3}$ *in*

[72] _____

73. The volume of a cube is 64 cubic inches. Its total surface area, in square inches, is

[A] 96 [B] 16 [C] 48 [D] 576

[73] _____

74. The volume of a rectangular pool is 1,080 cubic meters. Its length, width, and depth are in the ratio 10:4:1. Find the number of meters in each of the three dimensions of the pool.

[74] _____

75. A fish tank with a rectangular base has a volume of 3,360 cubic inches. The length and width of the tank are 14 inches and 12 inches, respectively. Find the height, in inches, of the tank.

[75] _____

76. A planned building was going to be 100 feet long, 75 feet deep, and 30 feet high. The owner decides to increase the volume of the building by 10% without changing the dimensions of the depth and the height. What will be the new length of this building?

[A] 110 ft [B] 112 ft

[C] 106 ft [D] 108 ft

[76] _____

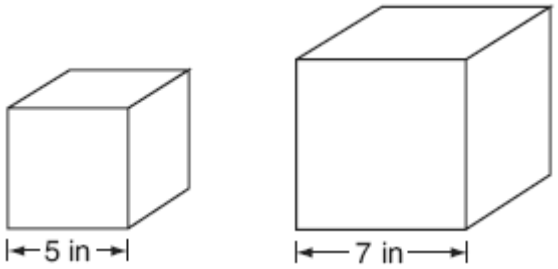
77. The dimensions of a brick, in inches, are 2 by 4 by 8. How many such bricks are needed to have a total volume of exactly 1 cubic foot?

[77] _____

78. Tina's preschool has a set of cardboard building blocks, each of which measures 9 inches by 9 inches by 4 inches. How many of these blocks will Tina need to build a wall 4 inches thick, 3 feet high, and 12 feet long?

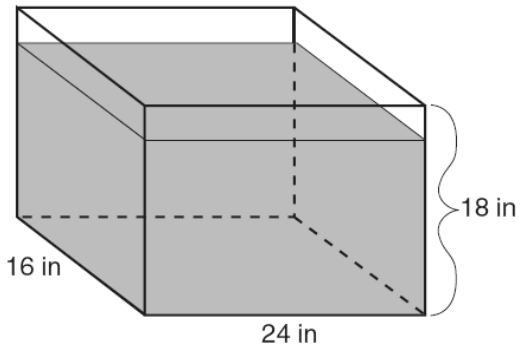
[78] _____

79. Tracey has two empty cube-shaped containers with sides of 5 inches and 7 inches, as shown in the accompanying diagram. She fills the smaller container completely with water and then pours all the water from the smaller container into the larger container. How deep, to the *nearest tenth of an inch*, will the water be in the larger container?



[79] _____

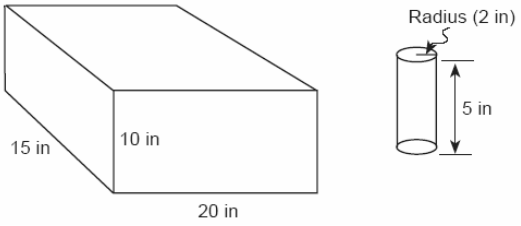
80. As shown in the accompanying diagram, the length, width, and height of Richard's fish tank are 24 inches, 16 inches, and 18 inches, respectively. Richard is filling his fish tank with water from a hose at the rate of 500 cubic inches per minute. How long will it take, to the *nearest minute*, to fill the tank to a depth of 15 inches?



(Not drawn to scale)

[80] _____

81. In the accompanying diagram, a rectangular container with the dimensions 10 inches by 15 inches by 20 inches is to be filled with water, using a cylindrical cup whose radius is 2 inches and whose height is 5 inches. What is the maximum number of full cups of water that can be placed into the container without the water overflowing the container?

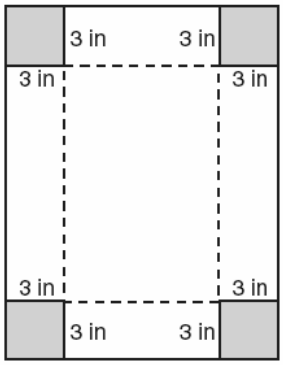


[81] _____

82. Tamika has a hard rubber ball whose circumference measures 13 inches. She wants to box it for a gift but can only find cube-shaped boxes of sides 3 inches, 4 inches, 5 inches, or 6 inches. What is the *smallest* box that the ball will fit into with the top on?

[82] _____

83. Deborah built a box by cutting 3-inch squares from the corners of a rectangular sheet of cardboard, as shown in the accompanying diagram, and then folding the sides up. The volume of the box is 150 cubic inches, and the longer side of the box is 5 inches more than the shorter side. Find the number of inches in the shorter side of the *original* sheet of cardboard.



[83] _____

84. A rectangular piece of cardboard is to be formed into an uncovered box. The piece of cardboard is 2 centimeters longer than it is wide. A square that measures 3 centimeters on a side is cut from each corner. When the sides are turned up to form the box, its volume is 765 cubic centimeters. Find the dimensions, in centimeters, of the original piece of cardboard.

[84] _____

85. Denise is designing a storage box in the shape of a cube. Each side of the box has a length of 10 inches. She needs more room and decides to construct a larger box in the shape of a cube with a volume of 2,000 cubic inches. By how many inches, to the *nearest tenth*, should she *increase* the length of each side of the original box?

[85] _____

Lesson 11-1: Simplifying Radicals

Part 1: Simplifying Radical Expressions Involving Products

1. The expression $\sqrt{50}$ can be simplified to

   [A] $5\sqrt{10}$ [B] $2\sqrt{25}$

   [C] $5\sqrt{2}$ [D] $25\sqrt{2}$

   [1] _____

2. When $\sqrt{72}$ is expressed in simplest $a\sqrt{b}$ form, what is the value of a?

   [A] 3 [B] 8 [C] 6 [D] 2

   [2] _____

3. Simplify: $\sqrt{50r^2s^4}$

   [3] _____

4. If a > 0, then $\sqrt{9a^2+16a^2}$ equals

   [A] $7a$ [B] $5a$ [C] $\sqrt{7a}$ [D] $5\sqrt{a}$

   [4] _____

5. Expressed in simplest radical form, the product of $\sqrt{6}\cdot\sqrt{15}$ is

   [A] $3\sqrt{10}$ [B] $3\sqrt{15}$

   [C] $\sqrt{90}$ [D] $9\sqrt{10}$

   [5] _____

6. If $x > 0$, the expression $(\sqrt{x})(\sqrt{2x})$ is equivalent to

   [A] $x^2\sqrt{2}$ [B] $x\sqrt{2}$

   [C] $\sqrt{2x}$ [D] $2x$

   [6] _____

Part 2: Simplifying Radical Expressions Involving Quotients

7. The expression $\frac{6\sqrt{20}}{3\sqrt{5}}$ is equivalent to

   [A] $3\sqrt{15}$ [B] $2\sqrt{15}$ [C] 4 [D] 8

   [7] _____

Lesson 11-2: Operations with Radical Expressions

Part 1: Simplifying Sums and Differences

8. The sum of $\sqrt{18}$ and $\sqrt{72}$ is

   [A] $9\sqrt{2}$ [B] $3\sqrt{10}$

   [C] $6\sqrt{3}$ [D] $\sqrt{90}$

   [8] _____

9. The sum of $\sqrt{75}$ and $\sqrt{3}$ is

   [A] 15 [B] $6\sqrt{3}$ [C] $\sqrt{78}$ [D] 18

   [9] _____

10. The expression $\sqrt{27}+\sqrt{12}$ is equivalent to

    [A] $13\sqrt{3}$ [B] $\sqrt{39}$

    [C] $5\sqrt{3}$ [D] $5\sqrt{6}$

    [10] _____

11. The expression $\sqrt{50}+\sqrt{32}$ is equivalent to

    [A] 6 [B] $\sqrt{82}$ [C] $9\sqrt{2}$ [D] 18

    [11] _____

12. The expression $\sqrt{28}+\sqrt{63}$ is equivalent to

[A] $\sqrt{91}$ [B] $5\sqrt{7}$

[C] $6\sqrt{7}$ [D] $13\sqrt{7}$

[12] _____

13. What is the sum of $5\sqrt{7}$ and $3\sqrt{28}$?

[A] $9\sqrt{7}$ [B] $8\sqrt{35}$

[C] $60\sqrt{7}$ [D] $11\sqrt{7}$

[13] _____

14. What is the sum of $\sqrt{50}$ and $\sqrt{32}$?

[A] $\sqrt{82}$ [B] $\sqrt{2}$

[C] $9\sqrt{2}$ [D] $20\sqrt{20}$

[14] _____

15. The expression $2\sqrt{50}-\sqrt{2}$ is equivalent to

[A] 10 [B] $49\sqrt{2}$

[C] $2\sqrt{48}$ [D] $9\sqrt{2}$

[15] _____

16. The expression $\sqrt{90}\cdot\sqrt{40}-\sqrt{8}\cdot\sqrt{18}$ simplifies to

[A] 22.9 [B] 864 [C] 3,456 [D] 48

[16] _____

Part 2: Simplifying Products and Quotients

17. Which expression is equivalent to $\frac{4}{3+\sqrt{2}}$?

[A] $\frac{12-4\sqrt{2}}{7}$ [B] $\frac{12+4\sqrt{2}}{11}$

[C] $\frac{12-4\sqrt{2}}{11}$ [D] $\frac{12+4\sqrt{2}}{7}$

[17] _____

18. The expression $\frac{12}{3+\sqrt{3}}$ is equivalent to

[A] $6-2\sqrt{3}$ [B] $4-2\sqrt{3}$

[C] $2+\sqrt{3}$ [D] $12-\sqrt{3}$

[18] _____

19. The expression $\frac{7}{2-\sqrt{3}}$ is equivalent to

[A] $14-7\sqrt{3}$ [B] $\frac{14+\sqrt{3}}{7}$

[C] $14+7\sqrt{3}$ [D] $\frac{2+\sqrt{3}}{7}$

[19] _____

20. The expression $\frac{7}{3-\sqrt{2}}$ is equivalent to

[A] $\frac{3+\sqrt{2}}{7}$ [B] $3+\sqrt{2}$

[C] $\frac{21+\sqrt{2}}{7}$ [D] $3-\sqrt{2}$

[20] _____

21. The expression $\frac{1}{5-\sqrt{13}}$ is equivalent to

[A] $\frac{5+\sqrt{13}}{-8}$ [B] $\frac{5+\sqrt{13}}{12}$

[C] $\frac{5+\sqrt{13}}{-12}$ [D] $\frac{5+\sqrt{13}}{8}$

[21] _____

22. The expression $\frac{4}{5-\sqrt{13}}$ is equivalent to

[A] $\frac{2(5-\sqrt{13})}{19}$ [B] $\frac{2(5+\sqrt{13})}{19}$

[C] $\frac{5+\sqrt{13}}{3}$ [D] $\frac{5-\sqrt{13}}{3}$

[22] _____

23. The expression $\frac{11}{\sqrt{3}-5}$ is equivalent to

[A] $\frac{-\sqrt{3}+5}{2}$ [B] $\frac{\sqrt{3}+5}{2}$

[C] $\frac{\sqrt{3}-5}{2}$ [D] $\frac{-\sqrt{3}-5}{2}$

[23] _____

24. The expression $\frac{5}{\sqrt{5}-1}$ is equivalent to

[A] $\frac{5}{4}$ [B] $\frac{5\sqrt{5}-5}{4}$

[C] $\frac{5\sqrt{5}-5}{6}$ [D] $\frac{5\sqrt{5}+5}{4}$

[24] _____

25. The fraction $\frac{3}{\sqrt{6}-1}$ is equivalent to

[A] $\frac{3\sqrt{6}+3}{5}$ [B] $\frac{3\sqrt{6}-3}{5}$

[C] $3\sqrt{6}-3$ [D] $3\sqrt{6}+3$

[25] _____

26. Which expression is equal to $\frac{2+\sqrt{3}}{2-\sqrt{3}}$?

[A] $\frac{1-4\sqrt{3}}{7}$ [B] $\frac{7+4\sqrt{3}}{7}$

[C] $7+4\sqrt{3}$ [D] $1-4\sqrt{3}$

[26] _____

27. Which expression represents the sum of $\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{2}}$?

[A] $\frac{\sqrt{3}+\sqrt{2}}{3}$ [B] $\frac{\sqrt{3}+\sqrt{2}}{2}$

[C] $\frac{2}{\sqrt{5}}$ [D] $\frac{2\sqrt{3}+3\sqrt{2}}{6}$

[27] _____

Lesson 11-3: Solving Radical Equations

Part 1: Solving Radical Equations

28. If $\sqrt{2x-1}+2=5$, then x is equal to

[A] 2 [B] 1 [C] 5 [D] 4

[28] _____

29. What is the solution of the equation $\sqrt{2x-3}-3=6$?

[A] 3 [B] 6 [C] 39 [D] 42

[29] _____

30. What is the solution set of the equation $x=2\sqrt{2x-3}$?

[A] {2,6} [B] {2} [C] {6} [D] { }

[30] _____

31. Solve for all values of q that satisfy the equation $\sqrt{3q+7}=q+3$.

[31] _____

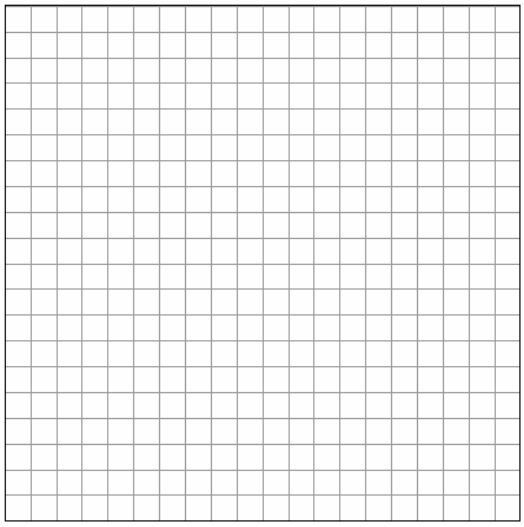
32. A wrecking ball suspended from a chain is a type of pendulum. The relationship between the rate of speed of the ball, *R*, the mass of the ball, *m*, the length of the chain, *L*, and the force, *F*, is $R=2\pi\sqrt{\frac{mL}{F}}$. Determine the force, *F*, to the *nearest hundredth*, when L = 12, m = 50, and R = 0.6.

[32] _____

33. The lateral surface area of a right circular cone, *s*, is represented by the equation $s=\pi r\sqrt{r^2+h^2}$, where *r* is the radius of the circular base and *h* is the height of the cone. If the lateral surface area of a large funnel is 236.64 square centimeters and its radius is 4.75 centimeters, find its height, to the *nearest hundredth of a centimeter*.

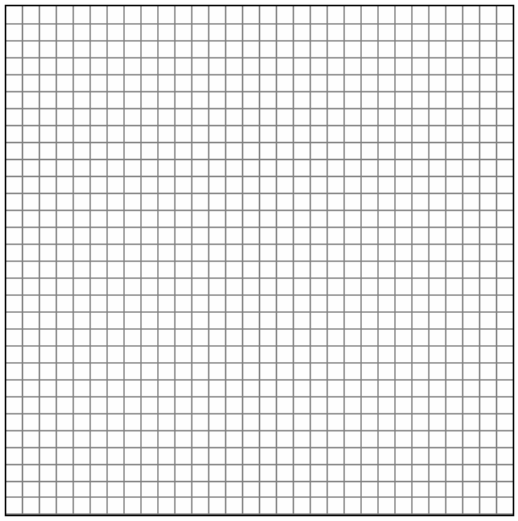
[33] _____

34. The equation $V=20\sqrt{C+273}$ relates speed of sound, *V*, in meters per second, to air temperature, *C*, in degrees Celsius. What is the temperature, in degrees Celsius, when the speed of sound is 320 meters per second? [The use of the accompanying grid is optional.]



[34] _____

35. The number of people, *y*, involved in recycling in a community is modeled by the function $y = 90\sqrt{3x} + 400$, where *x* is the number of months the recycling plant has been open.
Construct a table of values, sketch the function on the grid, and find the number of people involved in recycling exactly 3 months after the plant opened.
After how many months will 940 people be involved in recycling?



[35] _____

36. The path of a rocket is represented by the equation $y = \sqrt{25 - x^2}$. The path of a missile designed to intersect the path of the rocket is represented by the equation $x = \frac{3}{2}\sqrt{y}$. The value of *x* at the point of intersection is 3.
What is the corresponding value of *y*?

[A] -2 [B] 4 [C] -4 [D] 2

[36] _____

Part 2: Solving Equations with Extraneous Solutions

37. The solution set of the equation $\sqrt{x+6} = x$ is

[A] {3} [B] { } [C] {-2} [D] {-2,3}

[37] _____

38. What is the solution set of the equation $\sqrt{9x+10} = x$

[A] {10} [B] {10, -1}

[C] {9} [D] {-1}

[38] _____

39. Solve algebraically: $\sqrt{x+5} + 1 = x$

[39] _____

40. Solve algebraically for *x*: $\sqrt{3x+1} + 1 = x$

[40] _____

Extension P. 636-637: Standard Deviation

41. Jean's scores on five mathematics tests were 98, 97, 99, 98, and 96. Her scores on five English tests were 78, 84, 95, 72, and 79. Which statement is true about the standard deviations for the scores?

    [A] More information is needed to determine the relationship between the standard deviations.

    [B] The standard deviation for the math scores is greater than the standard deviation for the English scores.

    [C] The standard deviations for both sets of scores are equal.

    [D] The standard deviation for the English scores is greater than the standard deviation for the math scores.

    [41] _____

42. On a nationwide examination, the Adams School had a mean score of 875 and a standard deviation of 12. The Boswell School had a mean score of 855 and a standard deviation of 20. In which school was there greater consistency in the scores? Explain how you arrived at your answer.

    [42] _____

43. The term "snowstorms of note" applies to all snowfalls over 6 inches. The snowfall amounts for snowstorms of note in Utica, New York, over a four-year period are as follows: 7.1, 9.2, 8.0, 6.1, 14.4, 8.5, 6.1, 6.8, 7.7, 21.5, 6.7, 9.0, 8.4, 7.0, 11.5, 14.1, 9.5, 8.6
    What are the mean and population standard deviation for these data, to the *nearest hundredth*?

    [A] mean = 9.46; standard deviation = 3.85

    [B] mean = 9.45; standard deviation = 3.74

    [C] mean = 9.46; standard deviation = 3.74

    [D] mean = 9.45; standard deviation = 3.85

    [43] _____

44. The number of children of each of the first 41 United States presidents is given in the accompanying table. For this population, determine the mean and the standard deviation to the *nearest tenth*.
    How many of these presidents fall within one standard deviation of the mean?

Number of Children (x_i)	Number of Presidents (f_i)
0	6
1	2
2	8
3	6
4	7
5	3
6	5
7	1
8	1
10	1
15	1

    [44] _____

45. Conant High School has 17 students on its championship bowling team. Each student bowled one game. The scores are listed in the accompanying table.

Score (x_i)	Frequency (f_i)
140	4
145	3
150	2
160	3
170	2
180	2
194	1

Find, to the *nearest tenth*, the population standard deviation of these scores. How many of the scores fall within one standard deviation of the mean?

[45] _____

46. Beth's scores on the six Earth science tests she took this semester are 100, 95, 55, 85, 75, and 100. For this population, how many scores are within one standard deviation of the mean?

[46] _____

47. From 1984 to 1995, the winning scores for a golf tournament were 276, 279, 279, 277, 278, 278, 280, 282, 285, 272, 279, and 278. Using the standard deviation for the sample, S_x, find the percent of these winning scores that fall within one standard deviation of the mean.

[47] _____

48. An electronics company produces a headphone set that can be adjusted to accommodate different-sized heads. Research into the distance between the top of people's heads and the top of their ears produced the following data, in inches:
4.5, 4.8, 6.2, 5.5, 5.6, 5.4, 5.8, 6.0, 5.8, 6.2, 4.6, 5.0, 5.4, 5.8
The company decides to design their headphones to accommodate three standard deviations from the mean. Find, to the *nearest tenth*, the mean, the standard deviation, and the range of distances that must be accommodated.

[48] _____

49. On a standardized test, a score of 86 falls exactly 1.5 standard deviations below the mean. If the standard deviation for the test is 2, what is the mean score for this test?

[A] 87.5 [B] 89 [C] 84.5 [D] 84

[49] _____

Lesson 11-4: Graphing Square Root Functions

Part 1: Graphing Square Root Functions

50. What is the domain of $h(x) = \sqrt{x^2 - 4x - 5}$?

[A] $\{x | -5 \le x \le 1\}$

[B] $\{x | x \ge 5 \text{ or } x \le -1\}$

[C] $\{x | x \ge 1 \text{ or } x \le -5\}$

[D] $\{x | -1 \le x \le 5\}$

[50] _____

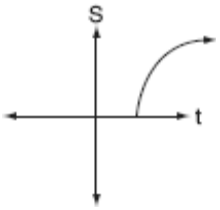
51. Which statement is true for all real number values of x?

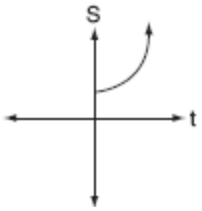
[A] $\sqrt{x^2} = |x|$ [B] $|x - 1| > 0$

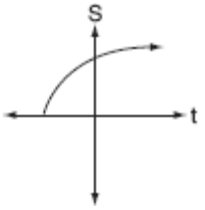
[C] $\sqrt{x^2} = x$ [D] $|x - 1| > (x - 1)$

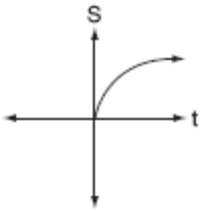
[51] _____

52. The formula $S = 20\sqrt{t + 273}$ is used to determine the speed of sound, S, in meters per second, near Earth's surface, where t is the surface temperature, in degrees Celsius. Which graph best represents this function?

[A] 

[B] 

[C] 

[D] 

[52] _____

53. What is the axis of symmetry of the graph of the equation $x = y^2$?

[A] y-axis [B] x-axis

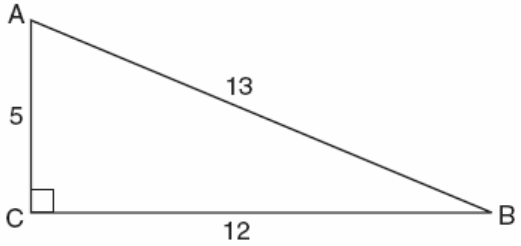
[C] line $y = -x$ [D] line $y = x$

[53] _____

Lesson 11-5: Trigonometric Ratios

Part 1: Finding Trigonometric Ratios

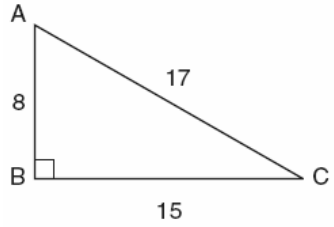
54. Which ratio represents $\cos A$ in the accompanying diagram of ΔABC?



[A] $\frac{13}{5}$ [B] $\frac{12}{5}$ [C] $\frac{12}{13}$ [D] $\frac{5}{13}$

[54] _____

55. In the accompanying diagram of right triangle ABC, $AB = 8$, $BC = 15$, $AC = 17$, and $m\angle ABC = 90$.

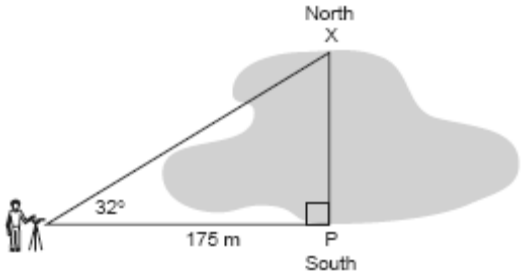


What is $\tan \angle C$?

[A] $\frac{8}{17}$ [B] $\frac{8}{15}$ [C] $\frac{17}{15}$ [D] $\frac{15}{17}$

[55] _____

56. A surveyor needs to determine the distance across the pond shown in the accompanying diagram. She determines that the distance from her position to point *P* on the south shore of the pond is 175 meters and the angle from her position to point *X* on the north shore is 32°. Determine the distance, *PX*, across the pond, rounded to the *nearest meter*.

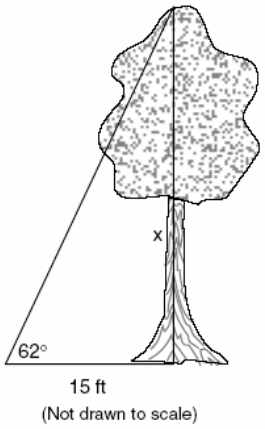


[56] _____

57. A 10-foot ladder is to be placed against the side of a building. The base of the ladder must be placed at an angle of 72° with the level ground for a secure footing. Find, to the *nearest inch*, how far the base of the ladder should be from the side of the building and how far up the side of the building the ladder will reach.

[57] _____

58. Find, to the *nearest tenth of a foot*, the height of the tree represented in the accompanying diagram.



[58] _____

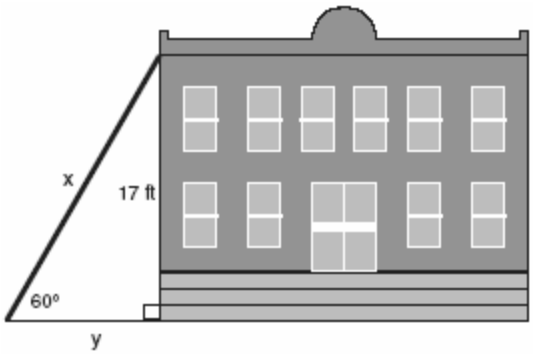
59. In the accompanying diagram, a ladder leaning against a building makes an angle of 58° with level ground. If the distance from the foot of the ladder to the building is 6 feet, find, to the *nearest foot*, how far up the building the ladder will reach.

[59] _____

60. Draw and label a diagram of the path of an airplane climbing at an angle of 11° with the ground. Find, to the *nearest foot*, the ground distance the airplane has traveled when it has attained an altitude of 400 feet.

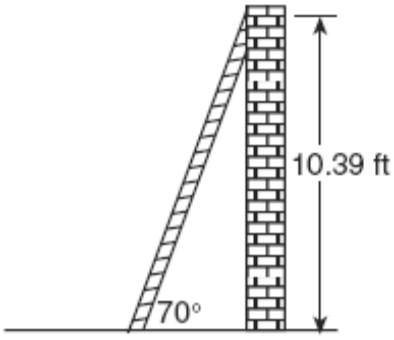
[60] _____

61. In the accompanying diagram, *x* represents the length of a ladder that is leaning against a wall of a building, and *y* represents the distance from the foot of the ladder to the base of the wall. The ladder makes a 60° angle with the ground and reaches a point on the wall 17 feet above the ground. Find the number of feet in *x* and *y*.



[61] _____

62. As shown in the accompanying diagram, a ladder is leaning against a vertical wall, making an angle of 70° with the ground and reaching a height of 10.39 feet on the wall. Find, to the *nearest foot*, the length of the ladder.
Find, to the *nearest foot*, the distance from the base of the ladder to the wall.



[62] _____

Lesson 11-6: Angles of Elevation and Depression

Part 1: Solving Problems Using Trigonometric Ratios

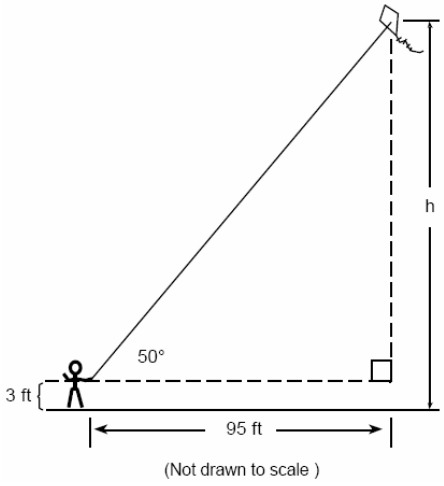
63. The angle of elevation from a point 25 feet from the base of a tree on level ground to the top of the tree is 30°. Which equation can be used to find the height of the tree?

[A] $\cos 30° = \frac{x}{25}$ [B] $\tan 30° = \frac{x}{25}$

[C] $\sin 30° = \frac{x}{25}$ [D] $30^2 + 25^2 = x^2$

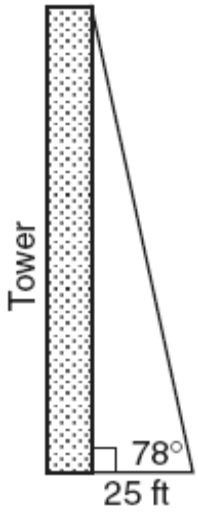
[63] _____

64. Joe is holding his kite string 3 feet above the ground, as shown in the accompanying diagram. The distance between his hand and a point directly under the kite is 95 feet. If the angle of elevation to the kite is 50°, find the height, *h*, of his kite, to the *nearest foot*.



[64] _____

65. From a point on level ground 25 feet from the base of a tower, the angle of elevation to the top of the tower is 78°, as shown in the accompanying diagram. Find the height of the tower, to the *nearest tenth of a foot*.



[65] _____

66. A tree casts a shadow that is 20 feet long. The angle of elevation from the end of the shadow to the top of the tree is 66°. Determine the height of the tree, to the *nearest foot.*

[66] _____

67. A ship on the ocean surface detects a sunken ship on the ocean floor at an angle of depression of 50°. The distance between the ship on the surface and the sunken ship on the ocean floor is 200 meters. If the ocean floor is level in this area, how far above the ocean floor, to the *nearest meter*, is the ship on the surface?

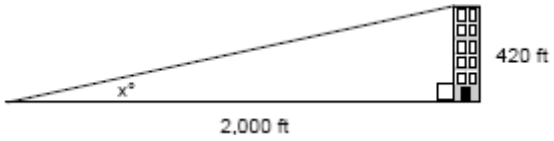
[67] _____

68. A person measures the angle of depression from the top of a wall to a point on the ground. The point is located on level ground 62 feet from the base of the wall and the angle of depression is 52°. How high is the wall, to the *nearest tenth of a foot*?

[68] _____

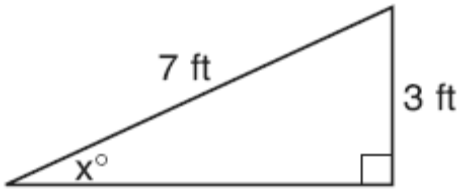
Extension P. 654: Finding Angles in Right Triangles

69. A person standing on level ground is 2,000 feet away from the foot of a 420-foot-tall building, as shown in the accompanying diagram. To the *nearest degree*, what is the value of *x*?



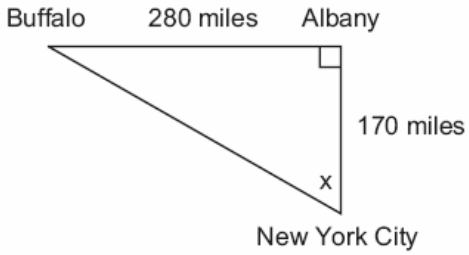
[69] _____

70. Ron and Francine are building a ramp for performing skateboard stunts, as shown in the accompanying diagram. The ramp is 7 feet long and 3 feet high. What is the measure of the angle, *x*, that the ramp makes with the ground, to the *nearest tenth of a degree*?



[70] _____

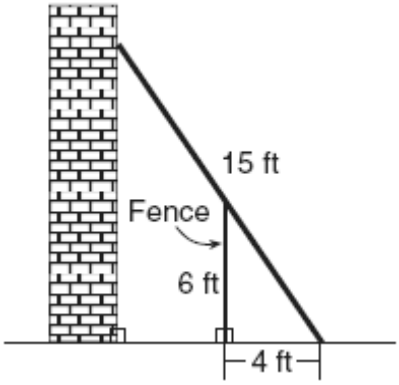
71. As seen in the accompanying diagram, a person can travel from New York City to Buffalo by going north 170 miles to Albany and then west 280 miles to Buffalo.



a If an engineer wants to design a highway to connect New York City directly to Buffalo, at what angle, *x*, would she need to build the highway? Find the angle to the *nearest degree*.
b To the *nearest mile*, how many miles would be saved by traveling directly from New York City to Buffalo rather than by traveling first to Albany and then to Buffalo?

[71] _____

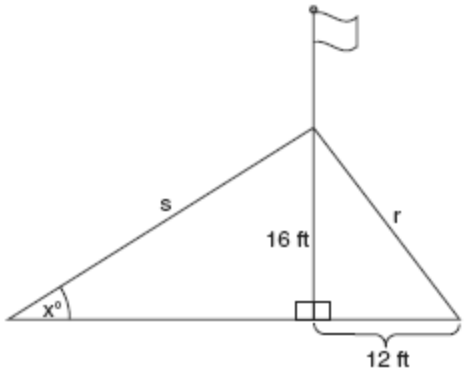
72. In the accompanying diagram, the base of a 15-foot ladder rests on the ground 4 feet from a 6-foot fence.



a If the ladder touches the top of the fence and the side of a building, what angle, to the *nearest degree*, does the ladder make with the ground?
b Using the angle found in part *a*, determine how far the top of the ladder reaches up the side of the building, to the *nearest foot*.

[72] _____

73. The accompanying diagram shows a flagpole that stands on level ground. Two cables, *r* and *s*, are attached to the pole at a point 16 feet above the ground. The combined length of the two cables is 50 feet. If cable *r* is attached to the ground 12 feet from the base of the pole, what is the measure of the angle, *x*, to the *nearest degree*, that cable *s* makes with the ground?



[73] _____

Lesson 12-1: Graphing Rational Functions

Part 1: Graphing Rational Functions

1. What is the total number of points of intersection of the graphs of the equations $xy = 12$ and $y = -x^2 + 3$?

   [A] 4 [B] 3 [C] 1 [D] 2

   [1] _____

2. For which value of x is the expression $\frac{x-7}{x+2}$ undefined?

   [A] 0 [B] 2 [C] -2 [D] 7

   [2] _____

3. For which value of x is the expression $\frac{3x-6}{x-4}$ undefined?

   [A] 0 [B] 4 [C] -4 [D] 2

   [3] _____

4. For which value of x will the fraction $\frac{3}{2x+4}$ be undefined?

   [A] -2 [B] -4 [C] 2 [D] 0

   [4] _____

5. For which value of x is the expression $\frac{3}{x-2}$ undefined?

   [A] 3 [B] 2 [C] 0 [D] -2

   [5] _____

6. Which expression is undefined when $w = 3$?

   [A] $\frac{w+1}{w^2-3w}$ [B] $\frac{3w}{3w^2}$

   [C] $\frac{w^2+2w}{5w}$ [D] $\frac{w-3}{w+1}$

   [6] _____

Lesson 12-2: Simplifying Rational Expressions

Part 1: Simplifying Rational Expressions

7. If $x \neq 0$, the expression $\frac{x^2+2x}{x}$ is equivalent to

   [A] $3x$ [B] 4 [C] $x + 2$ [D] 2

   [7] _____

8. Which polynomial is the quotient of $\frac{6x^3+9x^2+3x}{3x}$?

   [A] $2x+3$ [B] $6x^2+9x$

   [C] $2x^2+3x+1$ [D] $2x^2+3x$

   [8] _____

9. Simplify: $\frac{9x^2-15xy}{9x^2-25y^2}$

   [9] _____

10. Simplify: $\frac{x^2+6x+5}{x^2-25}$

    [10] _____

Lesson 12-3: Multiplying and Dividing Rational Expressions

Part 1: Multiplying Rational Expressions

11. If the length of a rectangular garden is represented by $\frac{x^2+2x}{x^2+2x-15}$ and its width is represented by $\frac{2x-6}{2x+4}$, which expression represents the area of the garden?

[A] x [B] $\frac{x}{x+5}$

[C] $\frac{x^2+2x}{2(x+5)}$ [D] $x+5$

[11] _____

12. A rectangular prism has a length of $\frac{2x^2+2x-24}{4x^2+x}$, a width of $\frac{x^2+x-6}{x+4}$, and a height of $\frac{8x^2+2x}{x^2-9}$. For all values of x for which it is defined, express, in terms of x, the volume of the prism in simplest form.

[12] _____

Part 2: Dividing Rational Expressions

13. Perform the indicated operation and express the result in simplest terms:

$$\frac{x}{x+3} \div \frac{3x}{x^2-9}$$

[13] _____

14. If $f(x)=\frac{3x^2-27}{18x+30}$ and $g(x)=\frac{x^2-7x+12}{3x^2-7x-20}$, find $f(x) \div g(x)$ for all values of x for which the expression is defined and express your answer in simplest form.

[14] _____

15. Express in simplest form:

$$\frac{4x+8}{x+1} \bullet \frac{2-x}{3x-15} \div \frac{x^2-4}{2x^2-8x-10}$$

[15] _____

16. Perform the indicated operations and simplify completely:

$$\frac{x^2-9}{x^2-5x} \bullet \frac{5x-x^2}{x^2-x-12} \div \frac{x-4}{x^2-8x+16}$$

[16] _____

Lesson 12-4: Dividing Polynomials

Part 1: Dividing Polynomials

17. When $3x^2-6x$ is divided by $3x$, the result is

[A] $x+2$ [B] $2x$

[C] $-2x$ [D] $x-2$

[17] _____

18. The expression $(50x^3-60x^2+10x) \div 10x$ is equivalent to

[A] $5x^2-6x$ [B] $5x^2-60x^2+10x$

[C] $5x^3-6x^2+x$ [D] $5x^2-6x+1$

[18] _____

Lesson 12-5: Adding and Subtracting Rational Expressions

Part 2: Adding and Subtracting Rational Expressions with Unlike Denominators

19. What is the least common denominator of $\frac{1}{2}$, $\frac{2}{7x}$, and $\frac{5}{x}$?

[A] $9x$ [B] $14x^2$ [C] $14x$ [D] $2x$

[19] _____

20. The sum of $\frac{3}{x}+\frac{2}{5}$, $x \neq 0$, is

[A] $\frac{2x+15}{5x}$ [B] $\frac{5}{x+5}$

[C] $\frac{1}{x}$ [D] $\frac{2x+15}{x+5}$

[20] _____

21. What is the sum of $\frac{2}{x}$ and $\frac{x}{2}$?

[A] $\frac{4+x^2}{2x}$ [B] 1

[C] $\frac{4+x}{2x}$ [D] $\frac{2+x}{2x}$

[21] _____

22. Which expression is equivalent to $\frac{a}{x}+\frac{b}{2x}$?

[A] $\frac{2a+b}{2x}$ [B] $\frac{2a+b}{x}$

[C] $\frac{a+b}{2x}$ [D] $\frac{a+b}{3x}$

[22] _____

23. What is the sum of $\frac{3}{7n}$ and $\frac{7}{3n}$?

[A] $\frac{42}{21n}$ [B] $\frac{10}{21n}$ [C] $\frac{1}{n}$ [D] $\frac{58}{21n}$

[23] _____

24. The expression $\frac{y}{x}-\frac{1}{2}$ is equivalent to

[A] $\frac{2y-x}{2x}$ [B] $\frac{x-2y}{2x}$

[C] $\frac{1-y}{2x}$ [D] $\frac{y-1}{x-2}$

[24] _____

25. Expressed as a single fraction, what is $\frac{1}{x+1}+\frac{1}{x}$, $x \neq 0,-1$?

[A] $\frac{2x+1}{x^2+x}$ [B] $\frac{2x+3}{x^2+x}$

[C] $\frac{3}{x^2}$ [D] $\frac{2}{2x+1}$

[25] _____

26. Express in simplest form: $\frac{1}{x}+\frac{1}{x+3}$

[26] _____

27. What is the sum of $\frac{3}{x-3}$ and $\frac{x}{3-x}$?

[A] 1 [B] -1 [C] 0 [D] $\frac{x+3}{x-3}$

[27] _____

28. What is the sum of $(y-5)+\frac{3}{y+2}$?

[A] $y-5$ [B] $\frac{y^2-3y-7}{y+2}$

[C] $\frac{y-2}{y+2}$ [D] $\frac{y^2-7}{y+2}$

[28] _____

Lesson 12-6: Solving Rational Equations

Part 1: Solving Rational Equations

29. What is the solution set of the equation $\frac{x}{x-4}-\frac{1}{x+3}=\frac{28}{x^2-x-12}$?

[A] {-6} [B] {4,-6} [C] { } [D] {4}

[29] _____

30. Solve for *x* and express your answer in simplest radical form:

$$\frac{4}{x}-\frac{3}{x+1}=7$$

[30] _____

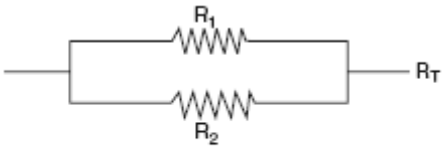
31. Solve for all values of *x*: $\frac{9}{x}+\frac{9}{x-2}=12$

[31] _____

32. Working by herself, Mary requires 16 minutes more than Antoine to solve a mathematics problem. Working together, Mary and Antoine can solve the problem in 6 minutes. If this situation is represented by the equation $\frac{6}{t}+\frac{6}{t+16}=1$, where *t* represents the number of minutes Antoine works alone to solve the problem, how many minutes will it take Antoine to solve the problem if he works by himself?

[32] _____

33. Electrical circuits can be connected in series, one after another, or in parallel circuits that branch off a main line. If circuits are hooked up in parallel, the reciprocal of the total resistance in the series is found by adding the reciprocals of each resistance, as shown in the accompanying diagram.



$$\frac{1}{R_1}+\frac{1}{R_2}=\frac{1}{R_T}$$

If $R_1=x$, $R_2=x+3$, and the total resistance, R_T, is 2.25 ohms, find the positive value of R_1 to the *nearest tenth of an ohm.*

[33] _____

Part 2: Solving Proportions

34. What is the value of *x* in the equation $\frac{x}{2x+1}=\frac{4}{3}$?

[A] $-\frac{5}{4}$ [B] $-\frac{4}{5}$ [C] -5 [D] $-\frac{1}{5}$

[34] _____

35. Solve for all values of x that satisfy the equation $\frac{x}{x+3}=\frac{5}{x+7}$.

[35] _____

36. Solve algebraically for x: $\frac{1}{x}=\frac{x+1}{6}$

[36] _____

37. A rectangle is said to have a golden ratio when $\frac{w}{h}=\frac{h}{w-h}$, where w represents width and h represents height. When $w = 3$, between which two consecutive integers will h lie?

[37] _____

Lesson 12-7: Counting Methods and Permutations

Part 1: Using the Multiplication Counting Principle

38. Max goes through the cafeteria line and counts seven different meals and three different desserts that he can choose. Which expression can be used to determine how many different ways Max can choose a meal and a dessert?

[A] $7!\bullet 3!$ [B] ${}_7P_3$

[C] ${}_7C_3$ [D] $7\bullet 3$

[38] _____

39. Robin has 8 blouses, 6 skirts, and 5 scarves. Which expression can be used to calculate the number of different outfits she can choose, if an outfit consists of a blouse, a skirt, and a scarf?

[A] $8!6!5!$ [B] ${}_{19}C_3$

[C] $8+6+5$ [D] $8\cdot 6\cdot 5$

[39] _____

40. Leo purchased five shirts, three pairs of pants, and four pairs of shoes. Which expression represents how many different outfits consisting of one shirt, one pair of pants, and one pair of shoes Leo can make?

[A] $5+3+4$ [B] ${}_{12}C_3$

[C] ${}_{12}P_3$ [D] $5\cdot 3\cdot 4$

[40] _____

41. How many different outfits consisting of a hat, a pair of slacks, and a sweater can be made from two hats, three pairs of slacks, and four sweaters?

[A] 9 [B] 24 [C] 29 [D] 12

[41] _____

42. Juan has three blue shirts, two green shirts, seven red shirts, five pairs of denim pants, and two pairs of khaki pants. How many different outfits consisting of one shirt and one pair of pants are possible?

[A] 420 [B] 84 [C] 130 [D] 19

[42] _____

43. Paloma has 3 jackets, 6 scarves, and 4 hats. Determine the number of different outfits consisting of a jacket, a scarf, and a hat that Paloma can wear.

[43] _____

44. The school cafeteria offers five sandwich choices, four desserts, and three beverages. How many different meals consisting of one sandwich, one dessert, and one beverage can be ordered?

[A] 3 [B] 1 [C] 12 [D] 60

[44] _____

45. A deli has five types of meat, two types of cheese, and three types of bread. How many different sandwiches, consisting of one type of meat, one type of cheese, and one type of bread, does the deli serve?

[A] 10 [B] 25 [C] 30 [D] 75

[45] _____

46. Cole's Ice Cream Stand serves sixteen different flavors of ice cream, three types of syrup, and seven types of sprinkles. If an ice cream sundae consists of one flavor of ice cream, one type of syrup, and one type of sprinkles, how many different ice cream sundaes can Cole serve?

[A] 26 [B] 3 [C] 336 [D] 10,836

[46] _____

47. In a school building, there are 10 doors that can be used to enter the building and 8 stairways to the second floor. How many different routes are there from outside the building to a class on the second floor?

[A] 18 [B] 80 [C] 10 [D] 1

[47] _____

48. Jeremy's bedroom has two doors leading into the hallway. His house has four doors leading to the outside. Using the doorways, in how many different ways can Jeremy leave his room and go outside?

[A] 4 [B] 8 [C] 6 [D] 5

[48] _____

49. A certain car comes in three body styles with a choice of two engines, a choice of two transmissions, and a choice of six colors. What is the minimum number of cars a dealer must stock to have one car of every possible combination?

[A] 36 [B] 42 [C] 72 [D] 13

[49] _____

50. Debbie goes to a diner famous for its express lunch menu. The menu has five appetizers, three soups, seven entrees, six vegetables, and four desserts. How many different meals consisting of either an appetizer *or* a soup, one entree, one vegetable, and one dessert can Debbie order?

[50] _____

51. When Kimberly bought her new car, she found that there were 72 different ways her car could be equipped. Her choices included four choices of engine and three choices of transmission. If her only other choice was color, how many choices of color did she have?

[A] 12 [B] 65 [C] 60 [D] 6

[51] _____

Part 2: Finding Permutations

52. The value of 5! is

[A] $\frac{1}{5}$ [B] 20 [C] 120 [D] 5

[52] _____

53. The value of $\frac{7!}{3!}$ is

[A] 24 [B] 4 [C] 7 [D] 840

[53] _____

54. What is the value of $\frac{8!}{4!}$?

[A] 2 [B] 2! [C] 1,680 [D] 4!

[54] _____

55. Which value is equivalent to ${}_3P_3$?

[A] 3! [B] 27 [C] 9 [D] 1

[55] _____

56. How many different 6-letter arrangements can be formed using the letters in the word "**ABSENT**," if each letter is used only once?

[A] 46,656 [B] 720 [C] 36 [D] 6

[56] _____

57. How many different 4-letter arrangements can be formed using the letters of the word "**JUMP**," if each letter is used only once?

[A] 4 [B] 24 [C] 16 [D] 12

[57] _____

58. What is the total number of different four-letter arrangements that can be formed from the letters in the word "**VERTICAL**," if each letter is used only once in an arrangement?

[A] 8 [B] 40,320

[C] 1,680 [D] 6,720

[58] _____

59. A locker combination system uses three digits from 0 to 9. How many different three-digit combinations with no digit repeated are possible?

[A] 30 [B] 720 [C] 504 [D] 1,000

[59] _____

60. How many different five-digit numbers can be formed from the digits 1, 2, 3, 4, and 5 if each digit is used only once?

[A] 20 [B] 24 [C] 120 [D] 60

[60] _____

61. All seven-digit telephone numbers in a town begin with 245. How many telephone numbers may be assigned in the town if the last four digits do *not* begin or end in a zero?

[61] _____

62. Julia has four different flags that she wants to hang on the wall of her room. How many different ways can the flags be arranged in a row?

[A] 1 [B] 16 [C] 24 [D] 10

[62] _____

63. Six members of a school's varsity tennis team will march in a parade. How many different ways can the players be lined up if Angela, the team captain, is always at the front of the line?

[63] _____

64. There were seven students running in a race. How many different arrangements of first, second, and third place are possible?

[64] _____

65. The telephone company has run out of seven-digit telephone numbers for an area code. To fix this problem, the telephone company will introduce a new area code. Find the number of new seven-digit telephone numbers that will be generated for the new area code if both of the following conditions must be met:
o The first digit cannot be a zero or a one.
o The first three digits cannot be the emergency number (911) or the number used for information (411).

[65] _____

66. In Jackson County, Wyoming, license plates are made with two letters (*A* through *Z*) followed by three digits (0 through 9). The plates are made according to the following restrictions:
o the first letter must be *J* or *W*, and the second letter can be any of the 26 letters in the alphabet
o no digit can be repeated
How many different license plates can be made with these restrictions?

[66] _____

67. A certain state is considering changing the arrangement of letters and numbers on its license plates. The two options the state is considering are:
Option 1: three letters followed by a four-digit number with repetition of both letters and digits allowed
Option 2: four letters followed by a three-digit number without repetition of either letters or digits
[Zero may be chosen as the first digit of the number in either option.]
Which option will enable the state to issue more license plates? How many *more* different license plates will that option yield?

[67] _____

Lesson 12-8: Combinations

Part 1: Combinations

68. The expression ${}_9C_2$ is equivalent to

[A] ${}_9P_2$ [B] ${}_9P_7$ [C] $\frac{9!}{2!}$ [D] ${}_9C_7$

[68] _____

69. How many different three-member teams can be selected from a group of seven students?

[A] 1 [B] 210 [C] 35 [D] 5,040

[69] _____

70. If the Math Olympiad Club consists of eighteen students, how many different teams of four students can be formed for competitions?

[A] 66 [B] 73,440 [C] 72 [D] 3,060

[70] _____

71. How many different three-member teams can be formed from six students?

[A] 20 [B] 120 [C] 720 [D] 216

[71] _____

72. There are 12 people on a basketball team, and the coach needs to choose 5 to put into a game. How many different possible ways can the coach choose a team of 5 if each person has an equal chance of being selected?

[A] ${}_5C_{12}$ [B] ${}_{12}P_5$ [C] ${}_{12}C_5$ [D] ${}_5P_{12}$

[72] _____

73. How many different five-member teams can be made from a group of eight students, if each student has an equal chance of being chosen?

[A] 40 [B] 56 [C] 336 [D] 6,720

[73] _____

74. In the next Olympics, the United States can enter four athletes in the diving competition. How many different teams of four divers can be selected from a group of nine divers?

[A] 6,561 [B] 126 [C] 3,024 [D] 36

[74] _____

75. Alan, Becky, Jesus, and Mariah are four students in the chess club. If two of these students will be selected to represent the school at a national convention, how many combinations of two students are possible?

[75] _____

76. Five people have volunteered to work on an awards dinner at Madison High School. How many different committees of four can be formed from the five people?

[A] 20 [B] 10 [C] 1 [D] 5

[76] _____

77. A committee of five members is to be randomly selected from a group of nine freshmen and seven sophomores. Which expression represents the number of different committees of three freshmen and two sophomores that can be chosen?

[A] ${}_9C_3 \cdot {}_7C_2$ [B] ${}_9C_3 + {}_7C_2$

[C] ${}_9P_3 \cdot {}_7P_2$ [D] ${}_{16}C_3 \cdot {}_{16}C_2$

[77] _____

78. An algebra class of 21 students must send 5 students to meet with the principal. How many different groups of 5 students could be formed from this class?

[78] _____

79. In a game, each player receives 5 cards from a deck of 52 different cards. How many different groupings of cards are possible in this game?

[A] $\frac{52!}{5!}$ [B] ${}_{52}P_5$ [C] 5! [D] ${}_{52}C_5$

[79] _____

80. Megan decides to go out to eat. The menu at the restaurant has four appetizers, three soups, seven entrees, and five desserts. If Megan decides to order an appetizer or a soup, and one entree, and two different desserts, how many different choices can she make?

[80] _____

81. On a bookshelf, there are five different mystery books and six different biographies. How many different sets of four books can Emilio choose if two of the books must be mystery books and two of the books must be biographies?

[81] _____

82. If there are four teams in a league, how many games will have to be played so that each team plays every other team once?

[A] 8 [B] 3 [C] 16 [D] 6

[82] _____

83. Five friends met for lunch, and they all shook hands. Each person shook the other person's right hand only once. What was the total number of handshakes?

[83] _____

Part 2: Probability with Counting Techniques

84. Three roses will be selected for a flower vase. The florist has 1 red rose, 1 white rose, 1 yellow rose, 1 orange rose and 1 pink rose from which to choose.
a How many different three rose selections can be formed from the 5 roses?
b What is the probability that 3 roses selected at random will contain 1 red rose, 1 white rose, and 1 pink rose?
c What is the probability that 3 roses selected at random will *not* contain an orange rose?

[84] _____

85. Paul orders a pizza. Chef Carl randomly chooses two different toppings to put on the pizza from the following: pepperoni, onion, sausage, mushrooms, and anchovies. If Paul will not eat pizza with mushrooms, determine the probability that Paul will *not* eat the pizza Chef Carl has made.

[85] _____

86. Sal has a small bag of candy containing three green candies and two red candies. While waiting for the bus, he ate two candies out of the bag, one after another, without looking. What is the probability that both candies were the same color?

[86] _____

87. Alexi's wallet contains four $1 bills, three $5 bills, and one $10 bill. If Alexi randomly removes two bills without replacement, determine whether the probability that the bills will total $15 is greater than the probability that the bills will total $2.

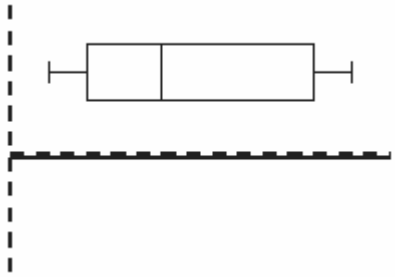
[87] _____

88. A bookshelf contains six mysteries and three biographies. Two books are selected at random without replacement.
a What is the probability that both books are mysteries?
b What is the probability that one book is a mystery and the other is a biography?

[88] _____

New York Additional Topics Lesson 2 P.732-737: Quartiles and Box-and-Whisker Plots

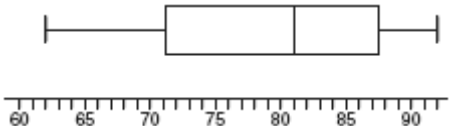
1. The accompanying diagram is an example of which type of graph?



[A] bar graph [B] box-and-whisker plot
[C] stem-and-leaf plot [D] histogram

[1] _____

2. The accompanying diagram shows a box-and-whisker plot of student test scores on last year's Mathematics A midterm examination.

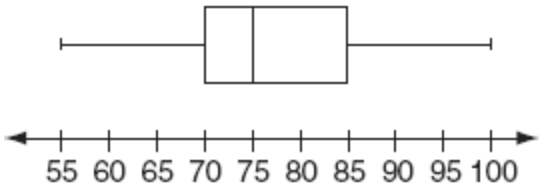


What is the median score?

[A] 71 [B] 62 [C] 81 [D] 92

[2] _____

3. The accompanying box-and-whisker plot represents the scores earned on a science test.



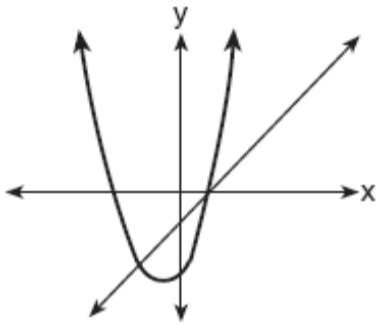
What is the median score?

[A] 75 [B] 70 [C] 85 [D] 77

[3] _____

New York Additional Topics Lesson 6 P.752-757: Systems of Linear and Quadratic Equations

4. The accompanying diagram shows the graphs of a linear equation and a quadratic equation.



How many solutions are there to this system of equations?

[A] 2 [B] 0 [C] 3 [D] 1

[4] _____

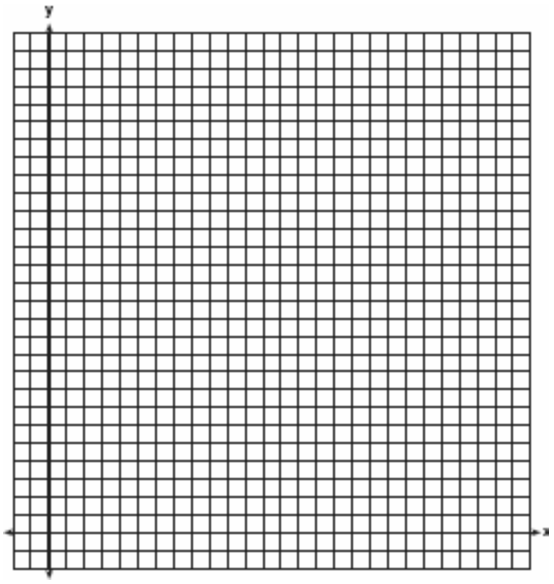
5. The graphs of the equations $y = x^2 + 4x - 1$ and $y + 3 = x$ are drawn on the same set of axes. At which point do the graphs intersect?

   [A] (1, 4) [B] (-2, -5)

   [C] (1, -2) [D] (-2, 1)

   [5] _____

6. A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 10x$. At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation $y = -x + 10$. Using the accompanying set of axes, graph the equations that represent the paths of the rocket and the flare, and find the coordinates of the point or points where the paths intersect.



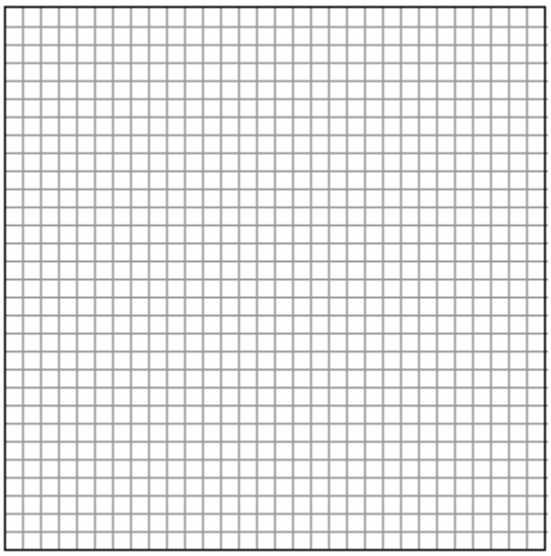
   [6] _____

7. Solve the following system of equations:

   $y = x^2 + 4x + 1$

   $y = 5x + 3$

   [The use of the grid is optional.]



   [7] _____

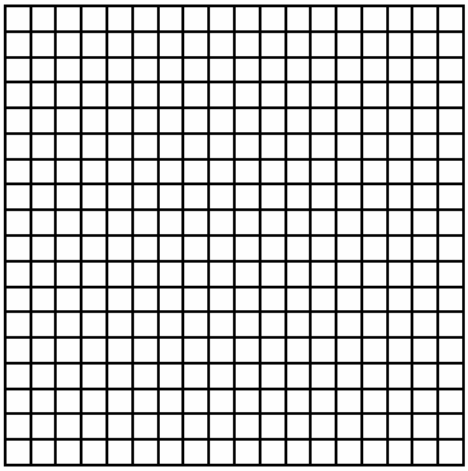
8. Solve the following system of equations algebraically or graphically for x and y:

$y = x^2 + 2x - 1$

$y = 3x + 5$

For an algebraic solution, show your work here .

For a graphic solution, show your work here.



[8] _____

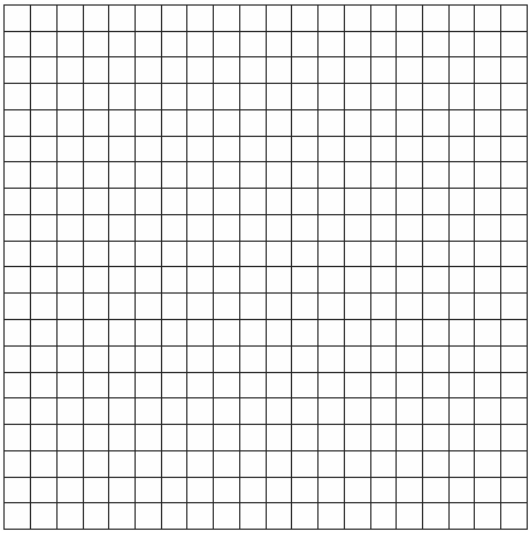
9. Solve the following system of equations algebraically.

$y = x^2 + 4x - 2$

$y = 2x + 1$

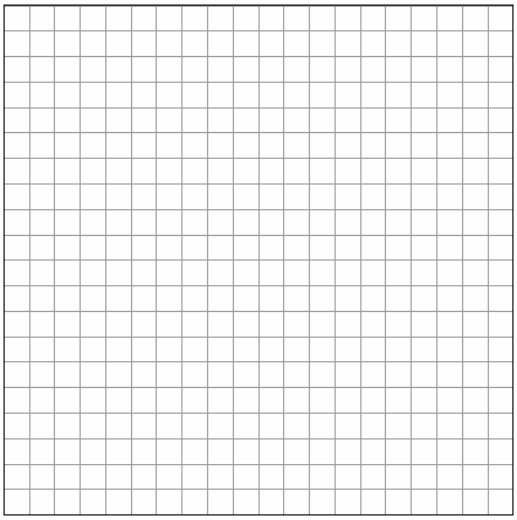
[9] _____

10. A pelican flying in the air over water drops a crab from a height of 30 feet. The distance the crab is from the water as it falls can be represented by the function $h(t) = -16t^2 + 30$, where t is time, in seconds. To catch the crab as it falls, a gull flies along a path represented by the function $g(t) = -8t + 15$. Can the gull catch the crab before the crab hits the water? Justify your answer. [The use of the accompanying grid is optional.]



[10] _____

11. The price of a stock, $A(x)$, over a 12-month period decreased and then increased according to the equation $A(x) = 0.75x^2 - 6x + 20$, where x equals the number of months. The price of another stock, $B(x)$, increased according to the equation $B(x) = 2.75x + 1.50$ over the same 12-month period. Graph and label both equations on the accompanying grid. State all prices, to the *nearest dollar*, when both stock values were the same.



[11] _____

Skills Handbook P.765: Perimeter, Area, and Volume

1. The equation $A = \frac{1}{2}(12)(3+7)$ is used to find the area of a trapezoid. Which calculation would *not* result in the correct area?

   [A] $\frac{12(3+7)}{2}$ [B] $\frac{12}{2} \times \frac{10}{2}$

   [C] $0.5(12)(10)$ [D] $6(3+7)$

   [1] _____

2. The second side of a triangle is two more than the first side, and the third side is three less than the first side. Which expression represents the perimeter of the triangle?

   [A] $x^2 - x - 6$ [B] $2x - 1$

   [C] $x + 5$ [D] $3x - 1$

   [2] _____

3. If the base of a triangle is represented by $x + 4$ and the height is represented by $2x$, which expression represents the area of the triangle?

   [A] $\frac{1}{2}(x+4)(2x)$ [B] $(x+4)+(2x)$

   [C] $(x+4)(2x)$ [D] $\frac{1}{2}((x+4)+(2x))$

   [3] _____

4. Sean knows the length of the base, *b*, and the area, *A*, of a triangular window in his bedroom. Which formula could he use to find the height, *h*, of this window?

   [A] $h = \frac{A}{2b}$ [B] $h = 2A - b$

   [C] $h = (2A)(b)$ [D] $h = \frac{2A}{b}$

   [4] _____

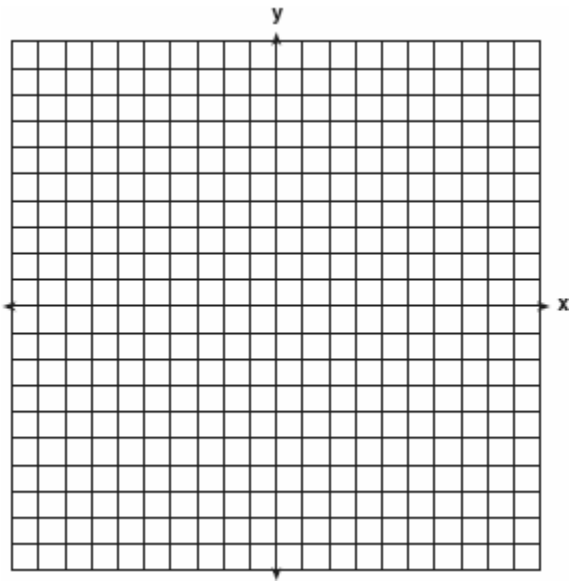
5. On the accompanying set of axes, graph and label the following lines:

   $y = 5$

   $x = -4$

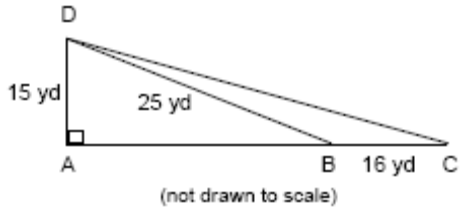
   $y = \frac{5}{4}x + 5$

   Calculate the area, in square units, of the triangle formed by the three points of intersection.



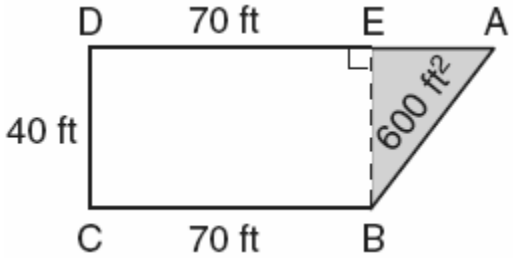
[5] _____

6. Mr. Gonzalez owns a triangular plot of land *BCD* with *DB* = 25 yards and *BC* = 16 yards. He wishes to purchase the adjacent plot of land in the shape of right triangle *ABD*, as shown in the accompanying diagram, with *AD* = 15 yards. If the purchase is made, what will be the total number of square yards in the area of his plot of land, ΔACD?



[6] _____

7. The plan of a parcel of land is represented by trapezoid *ABCD* in the accompanying diagram. If the area of ΔABE is 600 square feet, find the minimum number of feet of fence needed to completely enclose the entire parcel of land, *ABCD*.



[7] _____

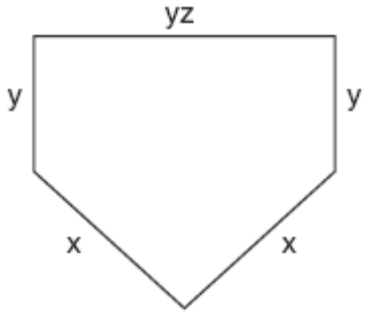
8. The Pentagon building in Washington, D.C., is shaped like a regular pentagon. If the length of one side of the Pentagon is represented by *n* + 2, its perimeter would be represented by

[A] $5n + 10$ [B] $10n$

[C] $n + 10$ [D] $5n + 2$

[8] _____

9. The lengths of the sides of home plate in a baseball field are represented by the expressions in the accompanying figure.



Which expression represents the perimeter of the figure?

[A] $2x + 3yz$ [B] $x^2 + y^3z$

[C] $5xyz$ [D] $2x + 2y + yz$

[9] _____

10. An engineer measured the dimensions for a rectangular site by using a wooden pole of unknown length *x*. The length of the rectangular site is 2 pole measures increased by 3 feet, while the width is 1 pole measure decreased by 4 feet. Write an algebraic representation, in terms of *x*, for the perimeter of the site.

[10] _____

11. The length of a side of a square window in Jessica's bedroom is represented by $2x - 1$. Which expression represents the area of the window?

[A] $4x^2 + 1$ [B] $4x^2 + 4x - 1$

[C] $4x^2 - 4x + 1$ [D] $2x^2 + 1$

[11] _____

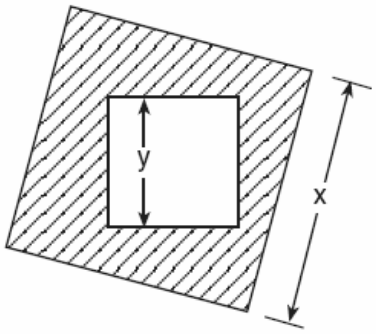
12. What is the area of a square whose perimeter is represented by $12x$?

[A] $12x^2$ [B] $144x^2$

[C] $6x\sqrt{2}$ [D] $9x^2$

[12] _____

13. The accompanying diagram shows a square with side y inside a square with side x.



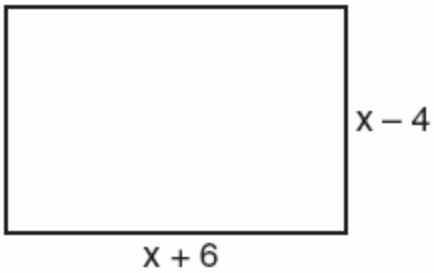
Which expression represents the area of the shaded region?

[A] $y^2 - x^2$ [B] $x^2 - y^2$

[C] y^2 [D] x^2

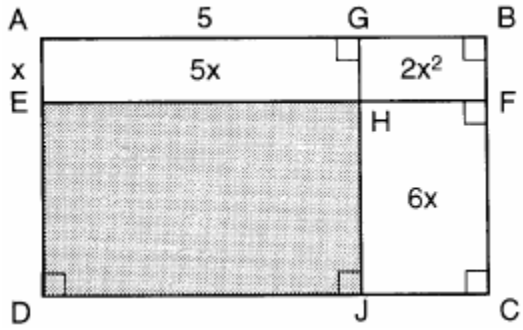
[13] _____

14. Express both the perimeter and the area of the rectangle shown in the accompanying diagram as polynomials in simplest form.



[14] _____

15. In the figure below, the large rectangle, *ABCD*, is divided into four smaller rectangles. The area of rectangle $AEHG = 5x$, the area of rectangle $GHFB = 2x^2$, the area of rectangle $HJCF = 6x$, segment $AG = 5$, and segment $AE = x$.



a Find the area of the shaded region.
b Write an expression for the area of the rectangle *ABCD* in terms of *x*.

[15] _____

16. A farmer has a rectangular field that measures 100 feet by 150 feet. He plans to increase the area of the field by 20%. He will do this by increasing the length and width by the same amount, *x*. Which equation represents the area of the new field?

[A] $(100 + 2x)(150 + x) = 18{,}000$

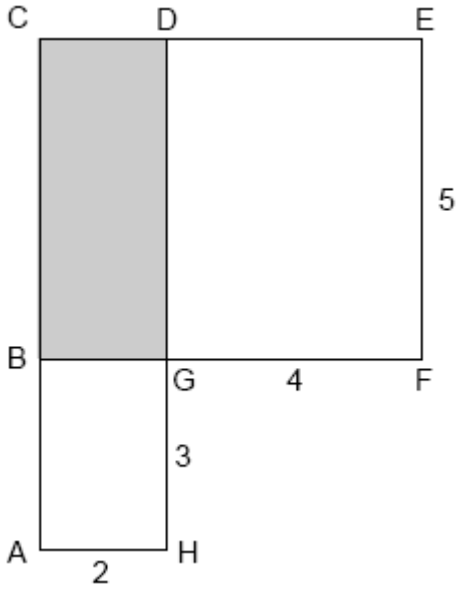
[B] $(100 + x)(150 + x) = 15{,}000$

[C] $(100 + x)(150 + x) = 18{,}000$

[D] $2(100 + x) + 2(150 + x) = 15{,}000$

[16] _____

17. In the accompanying figure, *ACDH* and *BCEF* are rectangles, $AH = 2$, $GH = 3$, $GF = 4$, and $FE = 5$.



What is the area of *BCDG*?

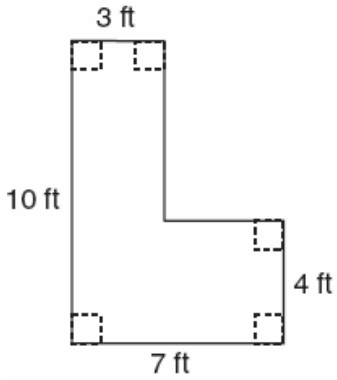
[A] 20 [B] 6 [C] 8 [D] 10

[17] _____

18. Kerry is planning a rectangular garden that has dimensions of 4 feet by 6 feet. Kerry wants one-half of the garden to have roses, and she says that the rose plot will have dimensions of 2 feet by 3 feet. Is she correct? Explain.

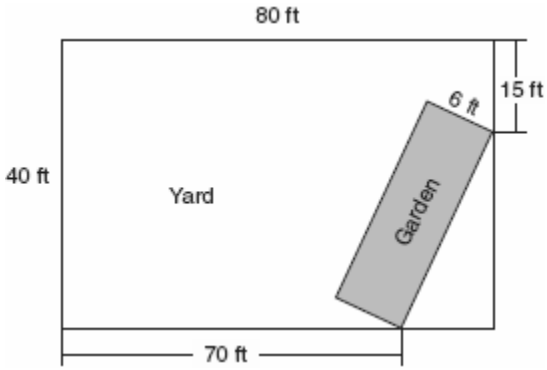
[18] _____

19. Keesha wants to tile the floor shown in the accompanying diagram. If each tile measures 1 foot by 1 foot and costs $2.99, what will be the total cost, including an 8% sales tax, for tiling the floor?



[19] _____

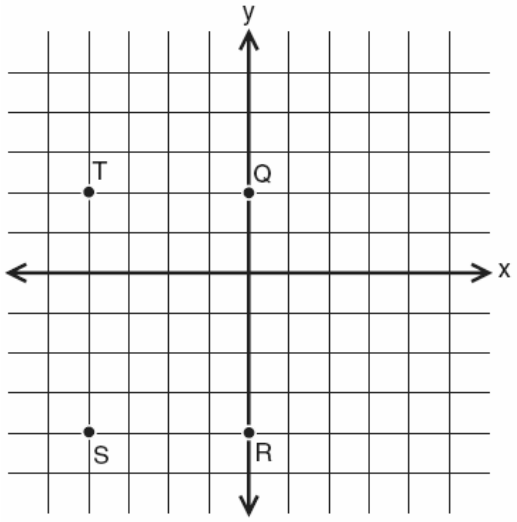
20. A rectangular garden is going to be planted in a person's rectangular backyard, as shown in the accompanying diagram. Some dimensions of the backyard and the width of the garden are given. Find the area of the garden to the *nearest square foot*.



[20] _____

Skills Handbook P.766: Translations

21. If x = -2 and y = -1, which point on the accompanying set of axes represents the translation $(x, y) \rightarrow (x+2, y-3)$?



[A] R [B] Q [C] S [D] T

[21] _____

22. What is the image of (x, y) after a translation of 3 units right and 7 units down?

[A] (x - 3, y - 7) [B] (x + 3, y + 7)

[C] (x + 3, y - 7) [D] (x - 3, y + 7)

[22] _____

23. What is the image of point (2,5) under the translation that shifts (x,y) to $(x+3, y-2)$?

[A] (0,8) [B] (5,8) [C] (0,3) [D] (5,3)

[23] _____

24. What are the coordinates of P', the image of P(-4, 0) under the translation $(x-3, y+6)$?

[A] (1,6) [B] (-7,6)

[C] (2,-3) [D] (7,-6)

[24] _____

25. The image of point (3,-5) under the translation that shifts (x,y) to $(x-1, y-3)$ is

[A] (2,8) [B] (-4,8)

[C] (2,-8) [D] (-3,15)

[25] _____

26. What is the image of point (-3, 4) under the translation that shifts (x,y) to $(x-3, y+2)$?

[A] (-6,6) [B] (0,6)

[C] (-6,8) [D] (6,6)

[26] _____

27. A translation moves P(3,5) to P'(6,1). What are the coordinates of the image of point $(-3,-5)$ under the same translation?

[A] (-6,-1) [B] (-5,-3)

[C] (-6,-9) [D] (0,-9)

[27] _____

28. The image of point (-2,3) under translation T is (3,-l). What is the image of point (4,2) under the same translation?

[A] (-1,6) [B] (0,7)

[C] (5,4) [D] (9,-2)

[28] _____

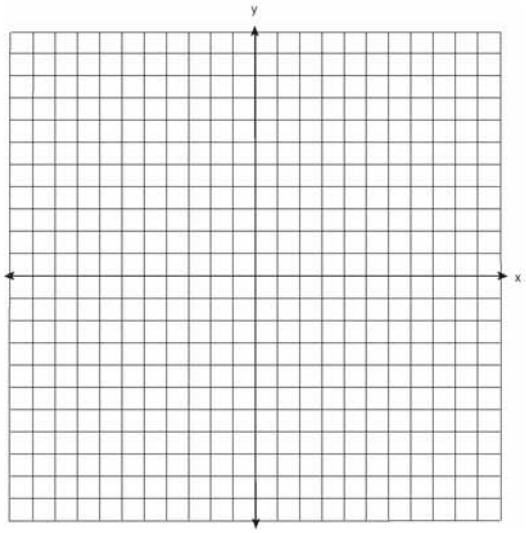
29. The image of the origin under a certain translation is the point (2,-6). The image of point $(-3,-2)$ under the same translation is the point

[A] (-1,-8) [B] (-6,12)

[C] $(-\frac{3}{2}, \frac{1}{3})$ [D] (-5,4)

[29] _____

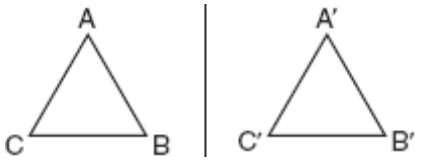
30. Two parabolic arches are to be built. The equation of the first arch can be expressed as $y = -x^2 + 9$, with a range of $0 \le y \le 9$, and the second arch is created by the transformation $T_{7,0}$. On the accompanying set of axes, graph the equations of the two arches. Graph the line of symmetry formed by the parabola and its transformation and label it with the proper equation.

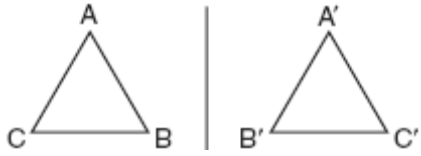


[30] _____

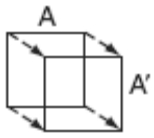
Skills Handbook P.767: Reflections

31. Ms. Brewer's art class is drawing reflected images. She wants her students to draw images reflected in a line. Which diagram represents a correctly drawn image?

[A] 

[B] 

[C] 

[D] 

[31] _____

32. When the point $(2, -5)$ is reflected in the *x*-axis, what are the coordinates of its image?

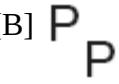
[A] (5, 2) [B] (-5, 2)

[C] (2, 5) [D] (-2, 5)

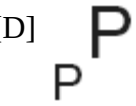
[32] _____

33. Which image represents a line reflection?

[A] 

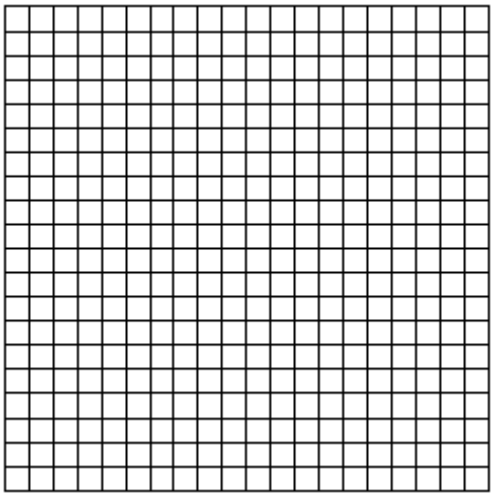
[B] 

[C] 

[D] 

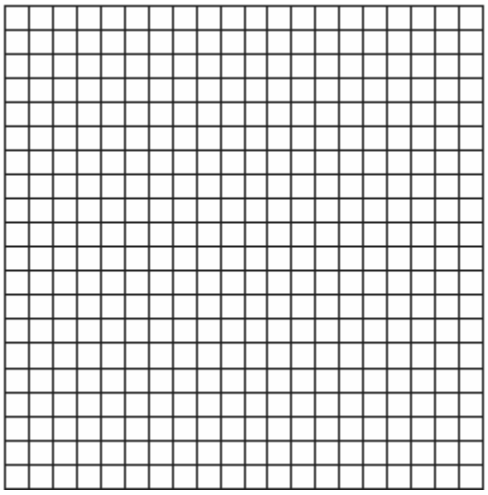
[33] _____

34. The coordinates of the endpoints of $\overline{AB}$ are $A(0,2)$ and $B(4,6)$. Graph and state the coordinates of A' and B', the images of A and B after $\overline{AB}$ is reflected in the x-axis.



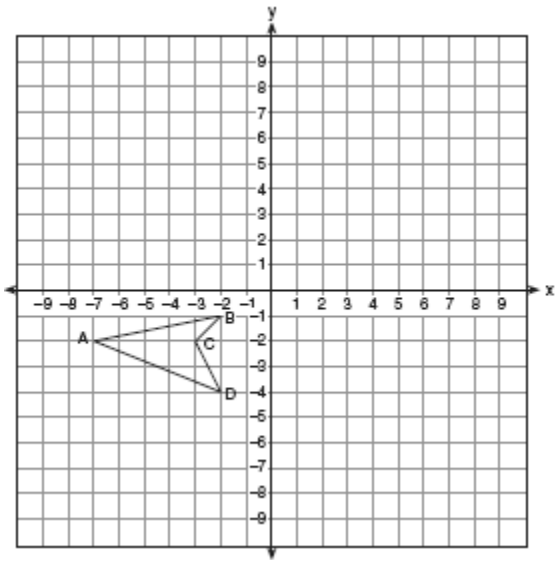
[34] _____

35. Triangle SUN has coordinates $S(0,6)$, $U(3,5)$, and $N(3,0)$. On the accompanying grid, draw and label ΔSUN. Then, graph and state the coordinates of $\Delta S'U'N'$, the image of ΔSUN after a reflection in the y-axis.



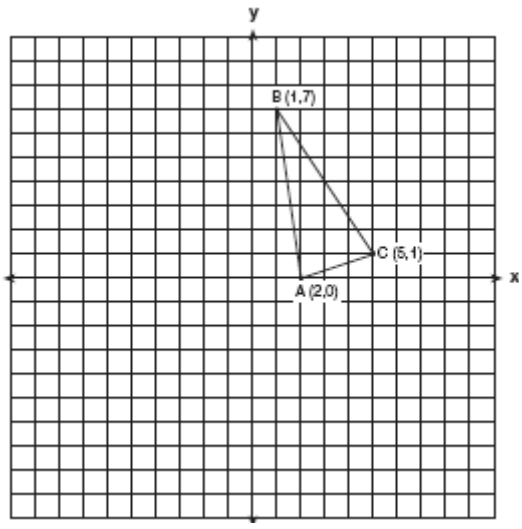
[35] _____

36. On the accompanying set of axes, draw the reflection of $ABCD$ in the y-axis. Label and state the coordinates of the reflected figure.



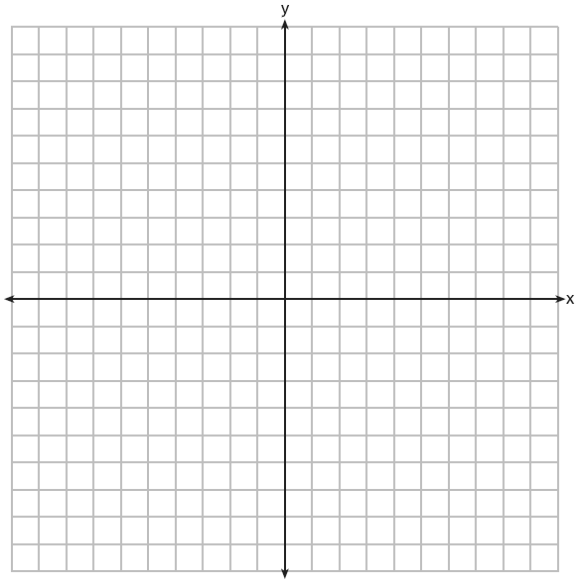
[36] _____

37. Triangle ABC has coordinates $A(2,0)$, $B(1,7)$, and $C(5,1)$. On the accompanying set of axes, graph, label, and state the coordinates of $\Delta A'B'C'$, the reflection of ΔABC in the y-axis.



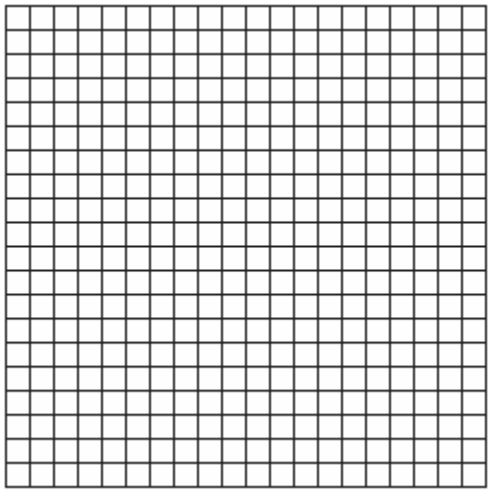
[37] _____

38. Carson is a decorator. He often sketches his room designs on the coordinate plane. He has graphed a square table on his grid so that its corners are at the coordinates *A*(2,6), *B*(7,8), *C*(9,3), and *D*(4,l). To graph a second identical table, he reflects *ABCD* over the *y*-axis. On the accompanying set of coordinate axes, sketch and label *ABCD* and its image *A'B'C'D'*, which show the locations of the two tables. Then find the number of square units in the area of *ABCD*.



[38] _____

39. On the accompanying grid, draw and label quadrilateral *ABCD* with points *A*(1,2), *B*(6,1), *C*(7,6), and *D*(3,7). On the same set of axes, plot and label quadrilateral *A'B'C'D'*, the reflection of quadrilateral *ABCD* in the y-axis. Determine the area, in square units, of quadrilateral *A'B'C'D'*.



[39] _____

40. What are the coordinates of point *P*, the image of point (3,-4) after a reflection in the line $y = x$?

[A] (-4,3) [B] (4,-3)

[C] (-3,4) [D] (3,4)

[40] _____

41. A function, f, is defined by the set {(2,3), (4,7), (-1,5)}. If f is reflected in the line $y = x$, which point will be in the reflection?

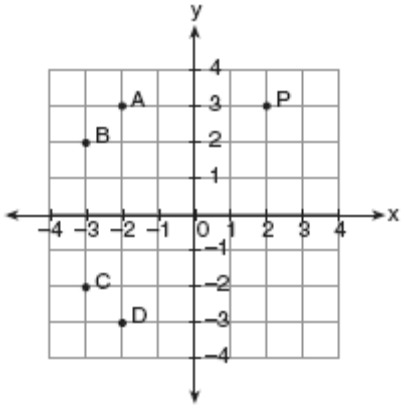
[A] (-5,1) [B] (-1,5)

[C] (5-1) [D] (1-5)

[41] _____

Skills Handbook P.768: Rotations

42. In the accompanying graph, if point P has coordinates (a,b), which point has coordinates $(-b,a)$?



[A] B [B] A [C] D [D] C

[42] _____

43. Point P' is the image of point $P(-3,4)$ after a translation defined by $T_{(7,-1)}$. Which other transformation on P would also produce P'?

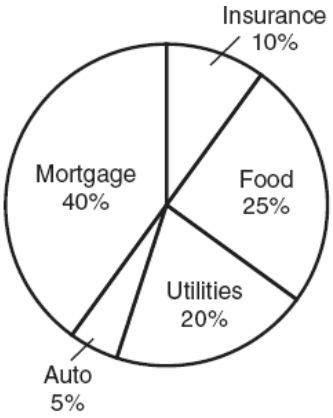
[A] $r_{y=-x}$ [B] $R_{90°}$

[C] r_{y-axis} [D] $R_{-90°}$

[43] _____

Skills Handbook P.773: Circle Graphs

44. The accompanying circle graph shows how the Marino family spends its income each month.



What is the measure, in degrees, of the central angle that represents the percentage of income spent on food?

[A] 90 [B] 50 [C] 360 [D] 25

[44] _____

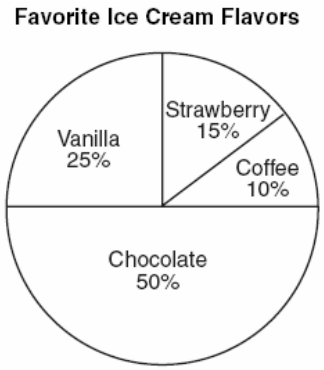
45. The accompanying circle graph shows how Shannon earned $600 during her summer vacation.

What is the measure of the central angle of the section labeled "Chores"?

[A] 60° [B] 90° [C] 30° [D] 120°

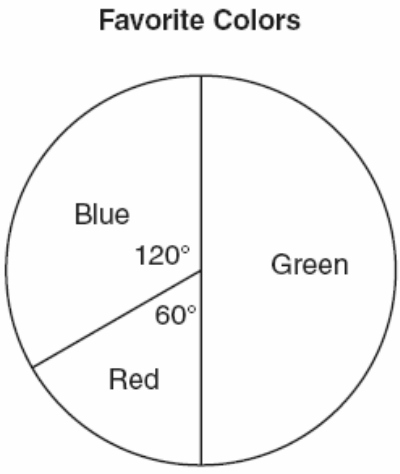
[45] _____

46. Mr. Smith's class voted on their favorite ice cream flavors, and the results are shown in the accompanying diagram. If there are 20 students in Mr. Smith's class, how many students chose coffee ice cream as their favorite flavor?



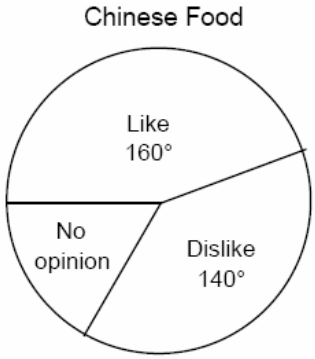
[46] _____

47. The accompanying circle graph shows the favorite colors of the 300 students in the ninth grade. How many students chose red as their favorite color?



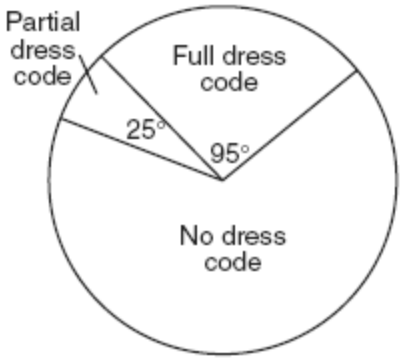
[47] _____

48. In a recent poll, 600 people were asked whether they liked Chinese food. A circle graph was constructed to show the results. The central angles for two of the three sectors are shown in the accompanying diagram. How many people had no opinion?



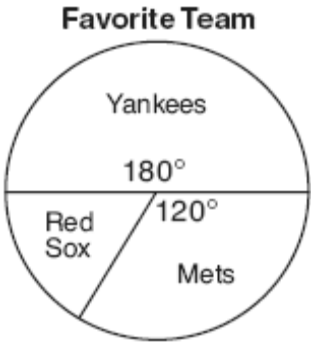
[48] _____

49. Nine hundred students were asked whether they thought their school should have a dress code. A circle graph was constructed to show the results. The central angles for two of the three sectors are shown in the accompanying diagram. What is the number of students who felt that the school should have no dress code?



[49] _____

50. In a recent poll in Syracuse, New York, 3,000 people were asked to pick their favorite baseball team. The accompanying circle graph shows the results of that poll.

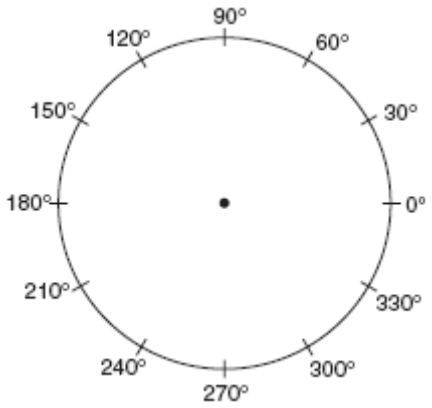


How many of the people polled picked the Red Sox as their favorite team?

[A] 1,200 [B] 300 [C] 1,800 [D] 500

[50] _____

51. In a class of 24 students, 10 have brown hair, 8 have black hair, 4 have blond hair, and 2 have red hair. On the accompanying diagram, construct a circle graph to show the students' hair color.



[51] _____