# JEFFERSON MATH PROJECT REGENTS BY PERFORMANCE INDICATOR: TOPIC

## NY Algebra 2/Trigonometry Regents Exam Questions from Fall, 2009 to June, 2011 Sorted by PI: Topic

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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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# Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

## GRAPHS AND STATISTICS

### A2.S.1-2: ANALYSIS OF DATA

1 Howard collected fish eggs from a pond behind his house so he could determine whether sunlight had an effect on how many of the eggs hatched. After he collected the eggs, he divided them into two tanks. He put both tanks outside near the pond, and he covered one of the tanks with a box to block out all sunlight. State whether Howard's investigation was an example of a controlled experiment, an observation, or a survey. Justify your response.

2 Which task is *not* a component of an observational study?
- 1 The researcher decides who will make up the sample.
- 2 The researcher analyzes the data received from the sample.
- 3 The researcher gathers data from the sample, using surveys or taking measurements.
- 4 The researcher divides the sample into two groups, with one group acting as a control group.

3 A doctor wants to test the effectiveness of a new drug on her patients. She separates her sample of patients into two groups and administers the drug to only one of these groups. She then compares the results. Which type of study *best* describes this situation?
- 1 census
- 2 survey
- 3 observation
- 4 controlled experiment

4 A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?
- 1 the size of the sample
- 2 the size of the population
- 3 the method of analyzing the data
- 4 the method of choosing the students who were surveyed

### A2.S.3: CENTRAL TENDENCY

5 The number of minutes students took to complete a quiz is summarized in the table below.

| Minutes | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|
| Number of Students | 5 | 3 | x | 5 | 2 | 10 | 1 |

If the mean number of minutes was 17, which equation could be used to calculate the value of $x$?
- 1 $17 = \frac{119 + x}{x}$
- 2 $17 = \frac{119 + 16x}{x}$
- 3 $17 = \frac{446 + x}{26 + x}$
- 4 $17 = \frac{446 + 16x}{26 + x}$

A2.S.4: DISPERSION

6 The table below shows the first-quarter averages for Mr. Harper's statistics class.

**Statistics Class Averages**

| Quarter Averages | Frequency |
|---|---|
| 99 | 1 |
| 97 | 5 |
| 95 | 4 |
| 92 | 4 |
| 90 | 7 |
| 87 | 2 |
| 84 | 6 |
| 81 | 2 |
| 75 | 1 |
| 70 | 2 |
| 65 | 1 |

What is the population variance for this set of data?
1 8.2
2 8.3
3 67.3
4 69.3

7 The scores of one class on the Unit 2 mathematics test are shown in the table below.

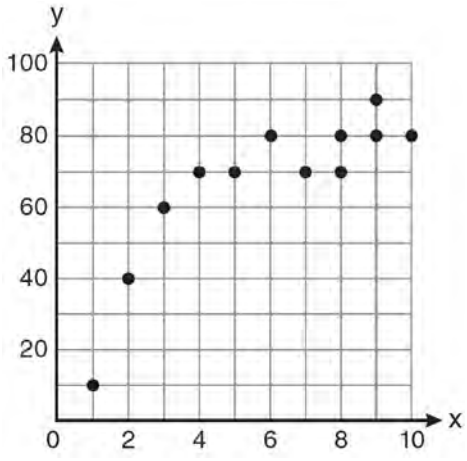
**Unit 2 Mathematics Test**

| Test Score | Frequency |
|---|---|
| 96 | 1 |
| 92 | 2 |
| 84 | 5 |
| 80 | 3 |
| 76 | 6 |
| 72 | 3 |
| 68 | 2 |

Find the population standard deviation of these scores, to the *nearest tenth*.

A2.S.6-7: REGRESSION

8 Samantha constructs the scatter plot below from a set of data.




Based on her scatter plot, which regression model would be most appropriate?
1 exponential
2 linear
3 logarithmic
4 power

9 The table below shows the results of an experiment involving the growth of bacteria.

| **Time (x)** (in minutes) | 1 | 3 | 5 | 7 | 9 | 11 |
|---|---|---|---|---|---|---|
| **Number of Bacteria (y)** | 2 | 25 | 81 | 175 | 310 | 497 |

Write a power regression equation for this set of data, rounding all values to *three decimal places*. Using this equation, predict the bacteria's growth, to the *nearest integer*, after 15 minutes.

10 The table below shows the number of new stores in a coffee shop chain that opened during the years 1986 through 1994.

| Year | Number of New Stores |
|---|---|
| 1986 | 14 |
| 1987 | 27 |
| 1988 | 48 |
| 1989 | 80 |
| 1990 | 110 |
| 1991 | 153 |
| 1992 | 261 |
| 1993 | 403 |
| 1994 | 681 |

Using $x = 1$ to represent the year 1986 and $y$ to represent the number of new stores, write the exponential regression equation for these data. Round all values to the *nearest thousandth.*

A2.S.8: CORRELATION COEFFICIENT

11 Which value of $r$ represents data with a strong negative linear correlation between two variables?
1 –1.07
2 –0.89
3 –0.14
4 0.92

A2.S.5: NORMAL DISTRIBUTIONS

12 The lengths of 100 pipes have a normal distribution with a mean of 102.4 inches and a standard deviation of 0.2 inch. If one of the pipes measures exactly 102.1 inches, its length lies
1 below the 16th percentile
2 between the 50th and 84th percentiles
3 between the 16th and 50th percentiles
4 above the 84th percentile

13 An amateur bowler calculated his bowling average for the season. If the data are normally distributed, about how many of his 50 games were within one standard deviation of the mean?
1 14
2 17
3 34
4 48

14 Assume that the ages of first-year college students are normally distributed with a mean of 19 years and standard deviation of 1 year. To the *nearest integer*, find the percentage of first-year college students who are between the ages of 18 years and 20 years, inclusive. To the *nearest integer*, find the percentage of first-year college students who are 20 years old or older.

15 In a study of 82 video game players, the researchers found that the ages of these players were normally distributed, with a mean age of 17 years and a standard deviation of 3 years. Determine if there were 15 video game players in this study over the age of 20. Justify your answer.

# PROBABILITY

A2.S.10: PERMUTATIONS

16 Which formula can be used to determine the total number of different eight-letter arrangements that can be formed using the letters in the word *DEADLINE*?
1 $8!$
2 $\frac{8!}{4!}$
3 $\frac{8!}{2!+2!}$
4 $\frac{8!}{2!\cdot 2!}$

17 Find the total number of different twelve-letter arrangements that can be formed using the letters in the word *PENNSYLVANIA.*

18 The letters of any word can be rearranged. Carol believes that the number of different 9-letter arrangements of the word "TENNESSEE" is greater than the number of different 7-letter arrangements of the word "VERMONT." Is she correct? Justify your answer.

19 A four-digit serial number is to be created from the digits 0 through 9. How many of these serial numbers can be created if 0 can *not* be the first digit, no digit may be repeated, and the last digit must be 5?
1 448
2 504
3 2,240
4 2,520

A2.S.11: COMBINATIONS

20 The principal would like to assemble a committee of 8 students from the 15-member student council. How many different committees can be chosen?
1 120
2 6,435
3 32,432,400
4 259,459,200

21 Ms. Bell's mathematics class consists of 4 sophomores, 10 juniors, and 5 seniors. How many different ways can Ms. Bell create a four-member committee of juniors if each junior has an equal chance of being selected?
1 210
2 3,876
3 5,040
4 93,024

A2.S.9: DIFFERENTIATING BETWEEN PERMUTATIONS AND COMBINATIONS

22 Twenty different cameras will be assigned to several boxes. Three cameras will be randomly selected and assigned to box A. Which expression can be used to calculate the number of ways that three cameras can be assigned to box A?
1 $20!$
2 $\frac{20!}{3!}$
3 ${}_{20}C_3$
4 ${}_{20}P_3$

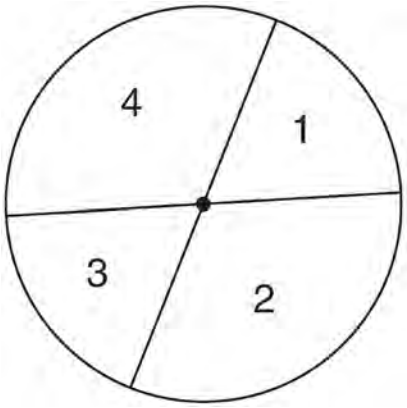
23 Three marbles are to be drawn at random, without replacement, from a bag containing 15 red marbles, 10 blue marbles, and 5 white marbles. Which expression can be used to calculate the probability of drawing 2 red marbles and 1 white marble from the bag?
1 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}C_3}$
2 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}C_3}$
3 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}P_3}$
4 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}P_3}$

A2.S.12: SAMPLE SPACE

24 A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

A2.S.13: GEOMETRIC PROBABILITY

25 A dartboard is shown in the diagram below. The two lines intersect at the center of the circle, and the central angle in sector 2 measures $\frac{2\pi}{3}$.




If darts thrown at this board are equally likely to land anywhere on the board, what is the probability that a dart that hits the board will land in either sector 1 or sector 3?

1 $\frac{1}{6}$

2 $\frac{1}{3}$

3 $\frac{1}{2}$

4 $\frac{2}{3}$

A2.S.15: BINOMIAL PROBABILITY

26 The members of a men's club have a choice of wearing black or red vests to their club meetings. A study done over a period of many years determined that the percentage of black vests worn is 60%. If there are 10 men at a club meeting on a given night, what is the probability, to the *nearest thousandth*, that *at least* 8 of the vests worn will be black?

27 A study shows that 35% of the fish caught in a local lake had high levels of mercury. Suppose that 10 fish were caught from this lake. Find, to the *nearest tenth of a percent*, the probability that *at least* 8 of the 10 fish caught did *not* contain high levels of mercury.

28 The probability that the Stormville Sluggers will win a baseball game is $\frac{2}{3}$. Determine the probability, to the *nearest thousandth*, that the Stormville Sluggers will win *at least* 6 of their next 8 games.

29 The probability that a professional baseball player will get a hit is $\frac{1}{3}$. Calculate the exact probability that he will get *at least* 3 hits in 5 attempts.

# ABSOLUTE VALUE

A2.A.1: ABSOLUTE VALUE EQUATIONS

30 What is the solution set of the equation $|4a + 6| - 4a = -10$?

1 $\varnothing$

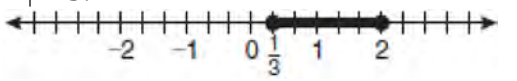
2 $\{0\}$

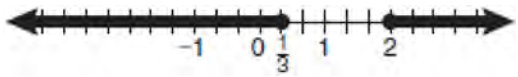
3 $\left\{\frac{1}{2}\right\}$

4 $\left\{0, \frac{1}{2}\right\}$

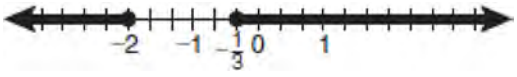
A2.A.1: ABSOLUTE VALUE INEQUALITIES

31 Which graph represents the solution set of $|6x - 7| \leq 5$?

1 


2 


3 


4 

32 Graph the inequality $-3|6-x| < -15$ for $x$. Graph the solution on the line below.



# QUADRATICS

## A2.A.20-21: ROOTS OF QUADRATICS

33 Find the sum and product of the roots of the equation $5x^2 + 11x - 3 = 0$.

34 For which equation does the sum of the roots equal $\frac{3}{4}$ and the product of the roots equal –2?

1 $4x^2 - 8x + 3 = 0$
2 $4x^2 + 8x + 3 = 0$
3 $4x^2 - 3x - 8 = 0$
4 $4x^2 + 3x - 2 = 0$

35 For which equation does the sum of the roots equal –3 and the product of the roots equal 2?

1 $x^2 + 2x - 3 = 0$
2 $x^2 - 3x + 2 = 0$
3 $2x^2 + 6x + 4 = 0$
4 $2x^2 - 6x + 4 = 0$

36 Write a quadratic equation such that the sum of its roots is 6 and the product of its roots is –27.

## A2.A.7: FACTORING POLYNOMIALS

37 Factored completely, the expression $6x - x^3 - x^2$ is equivalent to

1 $x(x+3)(x-2)$
2 $x(x-3)(x+2)$
3 $-x(x-3)(x+2)$
4 $-x(x+3)(x-2)$

38 Factored completely, the expression $12x^4 + 10x^3 - 12x^2$ is equivalent to

1 $x^2(4x+6)(3x-2)$
2 $2(2x^2+3x)(3x^2-2x)$
3 $2x^2(2x-3)(3x+2)$
4 $2x^2(2x+3)(3x-2)$

39 Factor completely: $10ax^2 - 23ax - 5a$

## A2.A.7: FACTORING THE DIFFERENCE OF PERFECT SQUARES

40 Factor the expression $12t^8 - 75t^4$ completely.

## A2.A.25: QUADRATIC FORMULA

41 The solutions of the equation $y^2 - 3y = 9$ are

1 $\frac{3 \pm 3i\sqrt{3}}{2}$
2 $\frac{3 \pm 3i\sqrt{5}}{2}$
3 $\frac{-3 \pm 3\sqrt{5}}{2}$
4 $\frac{3 \pm 3\sqrt{5}}{2}$

42 The roots of the equation $2x^2 + 7x - 3 = 0$ are

1 $-\frac{1}{2}$ and –3
2 $\frac{1}{2}$ and 3
3 $\frac{-7 \pm \sqrt{73}}{4}$
4 $\frac{7 \pm \sqrt{73}}{4}$

## A2.A.2: USING THE DISCRIMINANT

43 The roots of the equation $9x^2 + 3x - 4 = 0$ are

1 imaginary
2 real, rational, and equal
3 real, rational, and unequal
4 real, irrational, and unequal

44 The roots of the equation $x^2 - 10x + 25 = 0$ are
1 imaginary
2 real and irrational
3 real, rational, and equal
4 real, rational, and unequal

45 Use the discriminant to determine all value of $k$ that would result in the equation $x^2 - kx + 4 = 0$ having equal roots.

A2.A.24: COMPLETING THE SQUARE

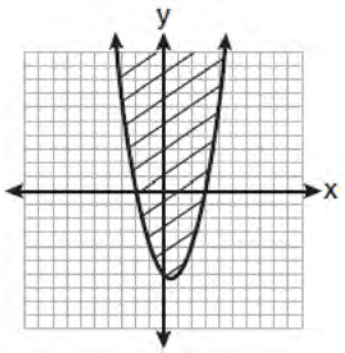
46 Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?
1 $\frac{7}{2}$
2 $\frac{49}{4}$
3 $\frac{49}{2}$
4 49

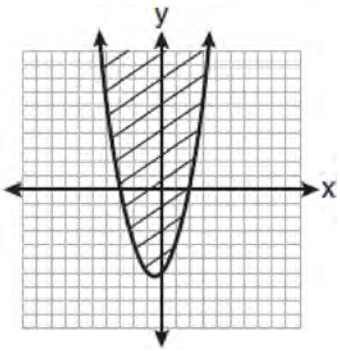
47 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be
1 $(x+3)^2 = 7$
2 $(x-3)^2 = 7$
3 $(x-3)^2 = 11$
4 $(x-6)^2 = 34$

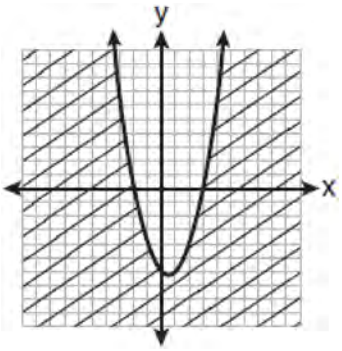
48 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

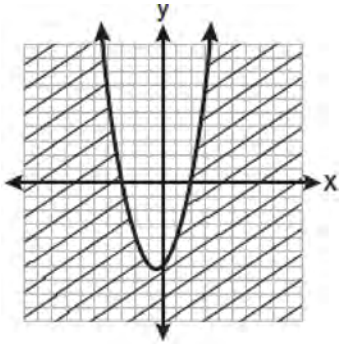
A2.A.4: QUADRATIC INEQUALITIES

49 Which graph best represents the inequality $y + 6 \geq x^2 - x$?

1 


2 


3 


4 

50 The solution set of the inequality $x^2 - 3x > 10$ is
1 $\{x \mid -2 < x < 5\}$
2 $\{x \mid 0 < x < 3\}$
3 $\{x \mid x < -2 \text{ or } x > 5\}$
4 $\{x \mid x < -5 \text{ or } x > 2\}$

# SYSTEMS

## A2.A.3: QUADRATIC-LINEAR SYSTEMS

51 Which values of $x$ are in the solution set of the following system of equations?

$$y = 3x - 6$$

$$y = x^2 - x - 6$$

1 $0, -4$
2 $0, 4$
3 $6, -2$
4 $-6, 2$

52 Solve the following systems of equations algebraically: $5 = y - x$

$$4x^2 = -17x + y + 4$$

# POWERS

## A2.N.3: OPERATIONS WITH POLYNOMIALS

53 When $\frac{3}{2}x^2 - \frac{1}{4}x - 4$ is subtracted from $\frac{5}{2}x^2 - \frac{3}{4}x + 1$, the difference is
1 $-x^2 + \frac{1}{2}x - 5$
2 $x^2 - \frac{1}{2}x + 5$
3 $-x^2 - x - 3$
4 $x^2 - x - 3$

54 Express $\left(\frac{2}{3}x - 1\right)^2$ as a trinomial.

55 Express the product of $\left(\frac{1}{2}y^2 - \frac{1}{3}y\right)$ and $\left(12y + \frac{3}{5}\right)$ as a trinomial.

## A2.A.8-9: NEGATIVE AND FRACTIONAL EXPONENTS

56 The expression $\frac{a^2b^{-3}}{a^{-4}b^2}$ is equivalent to
1 $\frac{a^6}{b^5}$
2 $\frac{b^5}{a^6}$
3 $\frac{a^2}{b}$
4 $a^{-2}b^{-1}$

57 If $a = 3$ and $b = -2$, what is the value of the expression $\frac{a^{-2}}{b^{-3}}$?
1 $-\frac{9}{8}$
2 $-1$
3 $-\frac{8}{9}$
4 $\frac{8}{9}$

58 When simplified, the expression $\left(\frac{w^{-5}}{w^{-9}}\right)^{\frac{1}{2}}$ is equivalent to
1 $w^{-7}$
2 $w^2$
3 $w^7$
4 $w^{14}$

59 When $x^{-1} - 1$ is divided by $x - 1$, the quotient is
1 $-1$
2 $-\frac{1}{x}$
3 $\frac{1}{x^2}$
4 $\frac{1}{(x-1)^2}$

60 Simplify the expression $\frac{3x^{-4}y^{5}}{(2x^{3}y^{-7})^{-2}}$ and write the answer using only positive exponents.

A2.A.12: EVALUATING EXPONENTIAL EXPRESSIONS

61 Matt places $1,200 in an investment account earning an annual rate of 6.5%, compounded continuously. Using the formula $V = Pe^{rt}$, where $V$ is the value of the account in $t$ years, $P$ is the principal initially invested, $e$ is the base of a natural logarithm, and $r$ is the rate of interest, determine the amount of money, to the *nearest cent*, that Matt will have in the account after 10 years.

62 Evaluate $e^{x\ln y}$ when $x = 3$ and $y = 2$.

A2.A.18: EVALUATING LOGARITHMIC EXPRESSIONS

63 The expression $\log_8 64$ is equivalent to

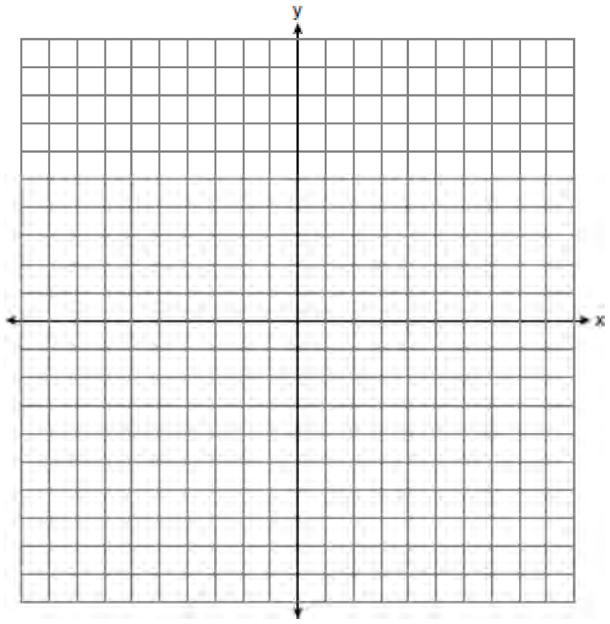
1 8
2 2
3 $\frac{1}{2}$
4 $\frac{1}{8}$

64 The expression $\log_5\left(\frac{1}{25}\right)$ is equivalent to

1 $\frac{1}{2}$
2 2
3 $-\frac{1}{2}$
4 $-2$

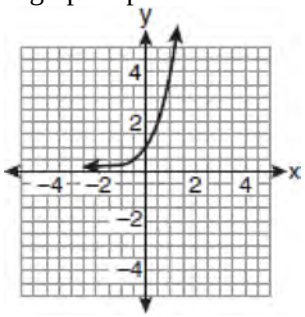
A2.A.53: GRAPHING EXPONENTIAL FUNCTIONS

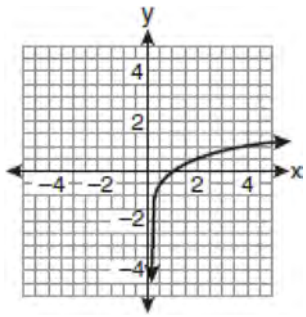
65 The graph of the equation $y = \left(\frac{1}{2}\right)^{x}$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^{x}$ and write the equation of this asymptote.

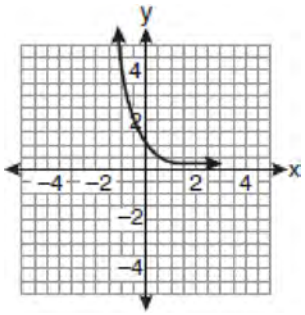


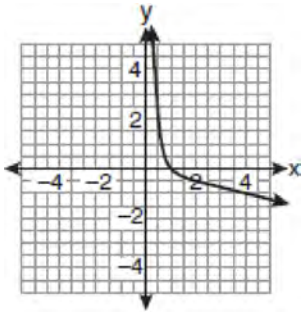
A2.A.54: GRAPHING LOGARITHMIC FUNCTIONS

66 If a function is defined by the equation $f(x) = 4^x$, which graph represents the inverse of this function?

1 


2 


3 


4 


A2.A.19: PROPERTIES OF LOGARITHMS

67 The expression $2\log x - (3\log y + \log z)$ is equivalent to

1 $\log \frac{x^2}{y^3 z}$

2 $\log \frac{x^2 z}{y^3}$

3 $\log \frac{2x}{3yz}$

4 $\log \frac{2xz}{3y}$

68 If $r = \sqrt[3]{\frac{A^2 B}{C}}$, then $\log r$ can be represented by

1 $\frac{1}{6}\log A + \frac{1}{3}\log B - \log C$

2 $3(\log A^2 + \log B - \log C)$

3 $\frac{1}{3}\log(A^2 + B) - C$

4 $\frac{2}{3}\log A + \frac{1}{3}\log B - \frac{1}{3}\log C$

A2.A.28: LOGARITHMIC EQUATIONS

69 What is the value of $x$ in the equation $\log_5 x = 4$?

1 1.16
2 20
3 625
4 1,024

70 What is the solution of the equation $2\log_4(5x) = 3$?

1 6.4
2 2.56
3 $\frac{9}{5}$
4 $\frac{8}{5}$

71 Solve algebraically for $x$: $\log_{x+3} \frac{x^3 + x - 2}{x} = 2$

72 The temperature, *T*, of a given cup of hot chocolate after it has been cooling for *t* minutes can best be modeled by the function below, where $T_0$ is the temperature of the room and *k* is a constant.

$$\ln(T - T_0) = -kt + 4.718$$

A cup of hot chocolate is placed in a room that has a temperature of 68°. After 3 minutes, the temperature of the hot chocolate is 150°. Compute the value of *k* to the nearest thousandth. [Only an algebraic solution can receive full credit.] Using this value of *k*, find the temperature, *T*, of this cup of hot chocolate if it has been sitting in this room for a total of 10 minutes. Express your answer to the *nearest degree*. [Only an algebraic solution can receive full credit.]

A2.A.27: EXPONENTIAL EQUATIONS

73 The solution set of $4^{x^2+4x} = 2^{-6}$ is
1 $\{1,3\}$
2 $\{-1,3\}$
3 $\{-1,-3\}$
4 $\{1,-3\}$

74 The value of *x* in the equation $4^{2x+5} = 8^{3x}$ is
1 1
2 2
3 5
4 −10

75 What is the value of *x* in the equation $9^{3x+1} = 27^{x+2}$?
1 1
2 $\frac{1}{3}$
3 $\frac{1}{2}$
4 $\frac{4}{3}$

76 Solve algebraically for *x*: $16^{2x+3} = 64^{x+2}$

77 Akeem invests $25,000 in an account that pays 4.75% annual interest compounded continuously. Using the formula $A = Pe^{rt}$, where *A* = the amount in the account after *t* years, *P* = principal invested, and *r* = the annual interest rate, how many years, to the *nearest tenth*, will it take for Akeem's investment to triple?
1 10.0
2 14.6
3 23.1
4 24.0

A2.A.36: BINOMIAL EXPANSIONS

78 What is the coefficient of the fourth term in the expansion of $(a - 4b)^9$?
1 $-5,376$
2 $-336$
3 336
4 5,376

79 What is the fourth term in the expansion of $(3x - 2)^5$?
1 $-720x^2$
2 $-240x$
3 $720x^2$
4 $1,080x^3$

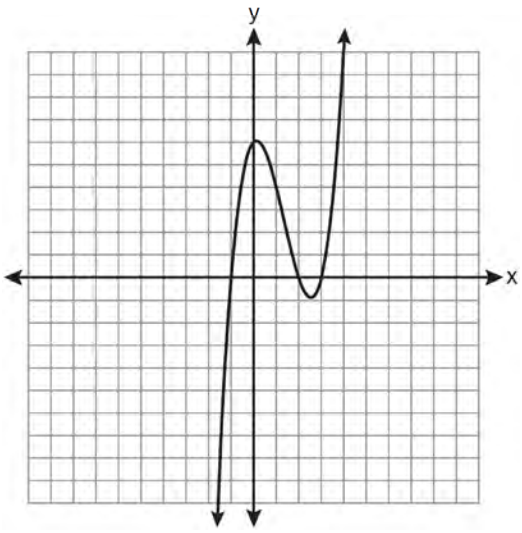
80 Write the binomial expansion of $(2x - 1)^5$ as a polynomial in simplest form.

A2.A.26, 50: SOLVING POLYNOMIAL EQUATIONS

81 Which values of *x* are solutions of the equation $x^3 + x^2 - 2x = 0$?
1 $0,1,2$
2 $0,1,-2$
3 $0,-1,2$
4 $0,-1,-2$

82 Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of *x*.

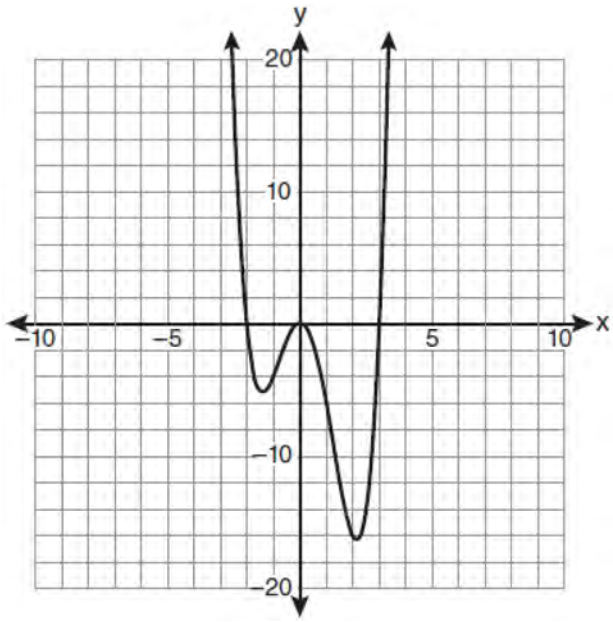
83 The graph of $y = x^3 - 4x^2 + x + 6$ is shown below.




What is the product of the roots of the equation $x^3 - 4x^2 + x + 6 = 0$?

1 −36
2 −6
3 6
4 4

84 The graph of $y = f(x)$ is shown below.




Which set lists all the real solutions of $f(x) = 0$?

1 {−3,2}
2 {−2,3}
3 {−3,0,2}
4 {−2,0,3}

A2.N.2, A.14: OPERATIONS WITH RADICALS

85 The product of $(3+\sqrt{5})$ and $(3-\sqrt{5})$ is

1 $4-6\sqrt{5}$
2 $14-6\sqrt{5}$
3 14
4 4

86 The expression $4ab\sqrt{2b} - 3a\sqrt{18b^3} + 7ab\sqrt{6b}$ is equivalent to

1 $2ab\sqrt{6b}$
2 $16ab\sqrt{2b}$
3 $-5ab + 7ab\sqrt{6b}$
4 $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

87 Express $\dfrac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$ in simplest radical form.

88 Express $5\sqrt{3x^3} - 2\sqrt{27x^3}$ in simplest radical form.

A2.N.5, A.15: RATIONALIZING DENOMINATORS

89 The fraction $\frac{3}{\sqrt{3a^2b}}$ is equivalent to

1 $\frac{1}{a\sqrt{b}}$

2 $\frac{\sqrt{b}}{ab}$

3 $\frac{\sqrt{3b}}{ab}$

4 $\frac{\sqrt{3}}{a}$

90 The expression $\frac{2x+4}{\sqrt{x+2}}$ is equivalent to

1 $\frac{(2x+4)\sqrt{x-2}}{x-2}$

2 $\frac{(2x+4)\sqrt{x-2}}{x-4}$

3 $2\sqrt{x-2}$

4 $2\sqrt{x+2}$

91 Which expression is equivalent to $\frac{\sqrt{3}+5}{\sqrt{3}-5}$?

1 $-\frac{14+5\sqrt{3}}{11}$

2 $-\frac{17+5\sqrt{3}}{11}$

3 $\frac{14+5\sqrt{3}}{14}$

4 $\frac{17+5\sqrt{3}}{14}$

92 The expression $\frac{4}{5-\sqrt{13}}$ is equivalent to

1 $\frac{4\sqrt{13}}{5\sqrt{13}-13}$

2 $\frac{4(5-\sqrt{13})}{38}$

3 $\frac{5+\sqrt{13}}{3}$

4 $\frac{4(5+\sqrt{13})}{38}$

93 Express $\frac{5}{3-\sqrt{2}}$ with a rational denominator, in simplest radical form.

A2.A.22: SOLVING RADICALS

94 The solution set of the equation $\sqrt{x+3} = 3-x$ is

1 $\{1\}$

2 $\{0\}$

3 $\{1,6\}$

4 $\{2,3\}$

95 The solution set of $\sqrt{3x+16} = x+2$ is

1 $\{-3,4\}$

2 $\{-4,3\}$

3 $\{3\}$

4 $\{-4\}$

A2.A.10-11: EXPONENTS AS RADICALS

96 The expression $x^{-\frac{2}{5}}$ is equivalent to

1 $-\sqrt[2]{x^5}$

2 $-\sqrt[5]{x^2}$

3 $\frac{1}{\sqrt[2]{x^5}}$

4 $\frac{1}{\sqrt[5]{x^2}}$

97 The expression $(x^2-1)^{-\frac{2}{3}}$ is equivalent to
1 $\sqrt[3]{(x^2-1)^2}$
2 $\frac{1}{\sqrt[3]{(x^2-1)^2}}$
3 $\sqrt{(x^2-1)^3}$
4 $\frac{1}{\sqrt{(x^2-1)^3}}$

98 The expression $\sqrt[4]{16x^2y^7}$ is equivalent to
1 $2x^{\frac{1}{2}}y^{\frac{7}{4}}$
2 $2x^8y^{28}$
3 $4x^{\frac{1}{2}}y^{\frac{7}{4}}$
4 $4x^8y^{28}$

A2.N.6: SQUARE ROOTS OF NEGATIVE NUMBERS

99 In simplest form, $\sqrt{-300}$ is equivalent to
1 $3i\sqrt{10}$
2 $5i\sqrt{12}$
3 $10i\sqrt{3}$
4 $12i\sqrt{5}$

A2.N.7: IMAGINARY NUMBERS

100 The product of $i^7$ and $i^5$ is equivalent to
1 1
2 $-1$
3 $i$
4 $-i$

101 The expression $2i^2+3i^3$ is equivalent to
1 $-2-3i$
2 $2-3i$
3 $-2+3i$
4 $2+3i$

A2.N.8: CONJUGATES OF COMPLEX NUMBERS

102 What is the conjugate of $-2+3i$?
1 $-3+2i$
2 $-2-3i$
3 $2-3i$
4 $3+2i$

103 The conjugate of $7-5i$ is
1 $-7-5i$
2 $-7+5i$
3 $7-5i$
4 $7+5i$

A2.N.9: MULTIPLICATION AND DIVISION OF COMPLEX NUMBERS

104 The expression $(3-7i)^2$ is equivalent to
1 $-40+0i$
2 $-40-42i$
3 $58+0i$
4 $58-42i$

# RATIONALS

A2.A.23: SOLVING RATIONALS

105 Solve for $x$: $\frac{4x}{x-3}=2+\frac{12}{x-3}$

106 Solve algebraically for $x$: $\frac{1}{x+3}-\frac{2}{3-x}=\frac{4}{x^2-9}$

A2.A.17: COMPLEX FRACTIONS

107 Written in simplest form, the expression $\frac{\frac{x}{4}-\frac{1}{x}}{\frac{1}{2x}+\frac{1}{4}}$ is equivalent to
1 $x-1$
2 $x-2$
3 $\frac{x-2}{2}$
4 $\frac{x^2-4}{x+2}$

108 Express in simplest form: $\dfrac{\frac{1}{2}-\frac{4}{d}}{\frac{1}{d}+\frac{3}{2d}}$

A2.A.5: INVERSE VARIATION

109 For a given set of rectangles, the length is inversely proportional to the width. In one of these rectangles, the length is 12 and the width is 6. For this set of rectangles, calculate the width of a rectangle whose length is 9.

# FUNCTIONS

A2.A.40-41: FAMILIES OF FUNCTIONS

110 The equation $y - 2\sin\theta = 3$ may be rewritten as

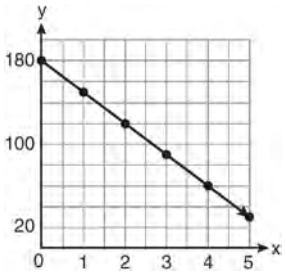
1 $f(y) = 2\sin x + 3$
2 $f(y) = 2\sin\theta + 3$
3 $f(x) = 2\sin\theta + 3$
4 $f(\theta) = 2\sin\theta + 3$

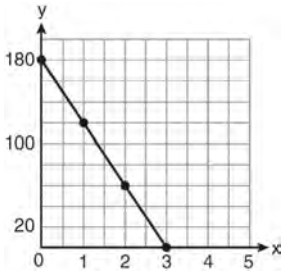
111 If $f(x) = \dfrac{x}{x^2 - 16}$, what is the value of f(−10)?

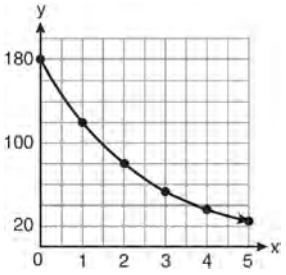
1 $-\frac{5}{2}$
2 $-\frac{5}{42}$
3 $\frac{5}{58}$
4 $\frac{5}{18}$

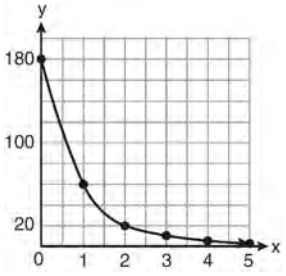
A2.A.52: FAMILIES OF FUNCTIONS

112 On January 1, a share of a certain stock cost $180. Each month thereafter, the cost of a share of this stock decreased by one-third. If *x* represents the time, in months, and *y* represents the cost of the stock, in dollars, which graph best represents the cost of a share over the following 5 months?

1 


2 


3 


4 

A2.A.52: IDENTIFYING THE EQUATION OF A GRAPH

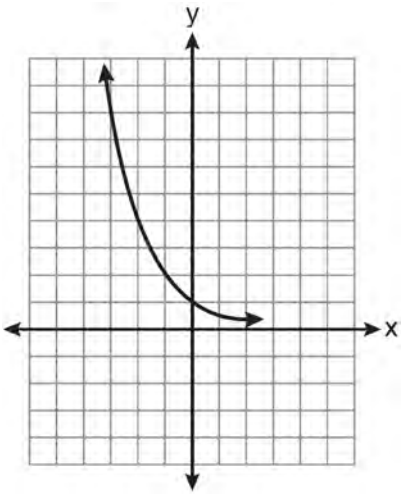
113 Four points on the graph of the function f($x$) are shown below.

$$\{(0,1),(1,2),(2,4),(3,8)\}$$

Which equation represents f($x$)?

1 $f(x) = 2^x$
2 $f(x) = 2x$
3 $f(x) = x + 1$
4 $f(x) = \log_2 x$

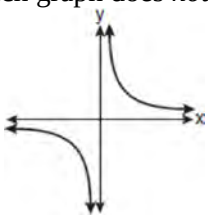
114 Which equation is represented by the graph below?

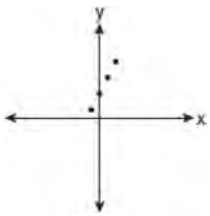


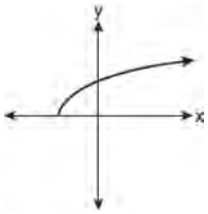

1 $y = 5^x$
2 $y = 0.5^x$
3 $y = 5^{-x}$
4 $y = 0.5^{-x}$

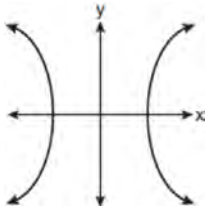
A2.A.38, 43: DEFINING FUNCTIONS

115 Which graph does *not* represent a function?

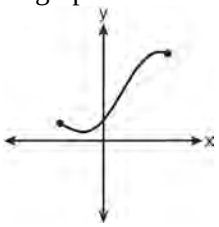
1 

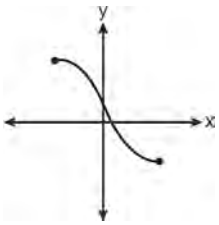

2 

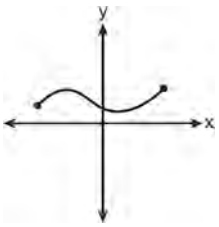

3 

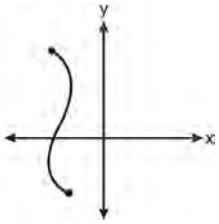

4 

116 Which graph does *not* represent a function?

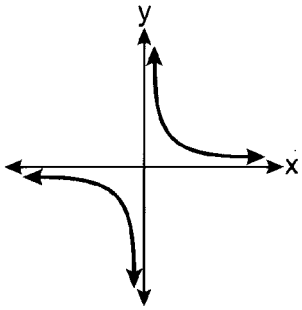
1 

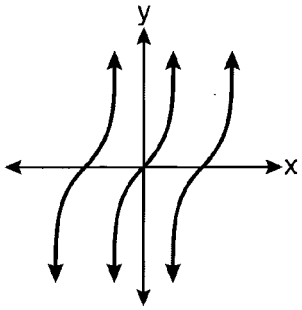

2 

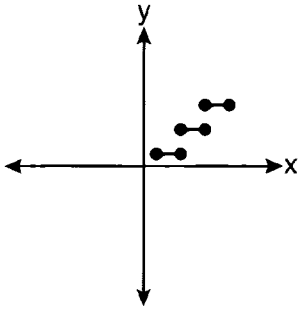

3 

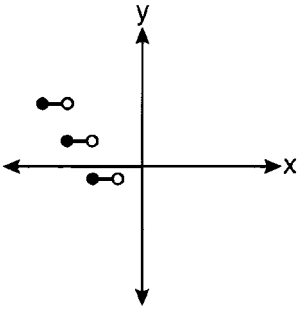

4 


117 Which graph represents a relation that is *not* a function?

1 


2 


3 


4 


118 Which relation is *not* a function?

1 $(x-2)^2+y^2=4$

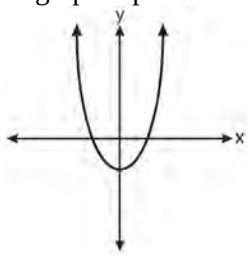
2 $x^2+4x+y=4$

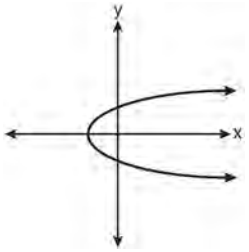
3 $x+y=4$

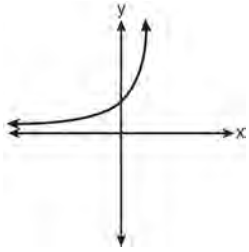
4 $xy=4$

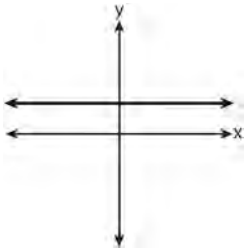
119 Which function is *not* one-to-one?
1 $\{(0,1),(1,2),(2,3),(3,4)\}$
2 $\{(0,0),(1,1),(2,2),(3,3)\}$
3 $\{(0,1),(1,0),(2,3),(3,2)\}$
4 $\{(0,1),(1,0),(2,0),(3,2)\}$

120 Which graph represents a one-to-one function?

1 


2 


3 

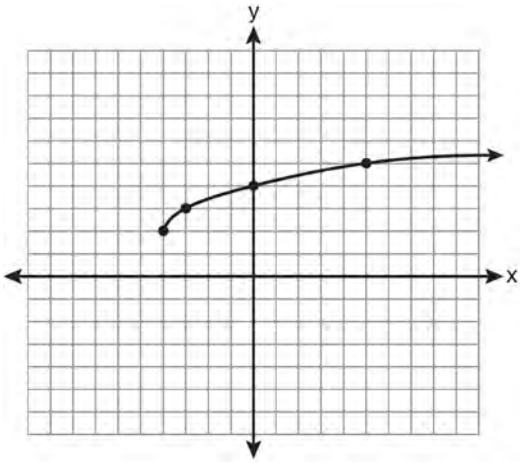

4 


A2.A.39, 51: DOMAIN AND RANGE

121 What is the domain of the function $f(x) = \sqrt{x-2} + 3$?
1 $(-\infty,\infty)$
2 $(2,\infty)$
3 $[2,\infty)$
4 $[3,\infty)$

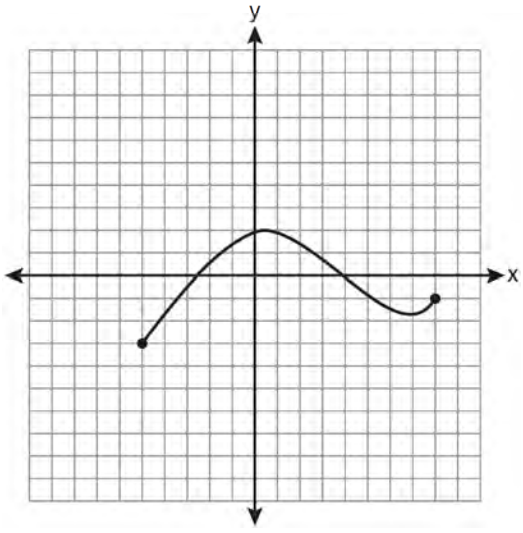
122 What is the range of $f(x) = (x+4)^2 + 7$?
1 $y \geq -4$
2 $y \geq 4$
3 $y = 7$
4 $y \geq 7$

123 What are the domain and the range of the function shown in the graph below?




1 $\{x \mid x > -4\}$; $\{y \mid y > 2\}$
2 $\{x \mid x \geq -4\}$; $\{y \mid y \geq 2\}$
3 $\{x \mid x > 2\}$; $\{y \mid y > -4\}$
4 $\{x \mid x \geq 2\}$; $\{y \mid y \geq -4\}$

124 The graph below represents the function $y = f(x)$.




State the domain and range of this function.

A2.A.42: COMPOSITIONS OF FUNCTIONS

125 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?
1 $-13$
2 3.5
3 3
4 6

126 If $f(x) = x^2 - 5$ and $g(x) = 6x$, then $g(f(x))$ is equal to
1 $6x^3 - 30x$
2 $6x^2 - 30$
3 $36x^2 - 5$
4 $x^2 + 6x - 5$

127 If $f(x) = x^2 - 6$ and $g(x) = 2^x - 1$, determine the value of $(g \circ f)(-3)$.

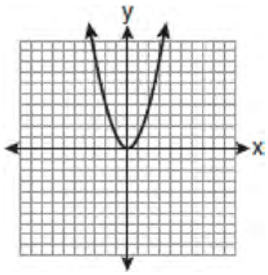
A2.A.44: INVERSE OF FUNCTIONS

128 Which two functions are inverse functions of each other?
1 $f(x) = \sin x$ and $g(x) = \cos(x)$
2 $f(x) = 3 + 8x$ and $g(x) = 3 - 8x$
3 $f(x) = e^x$ and $g(x) = \ln x$
4 $f(x) = 2x - 4$ and $g(x) = -\frac{1}{2}x + 4$

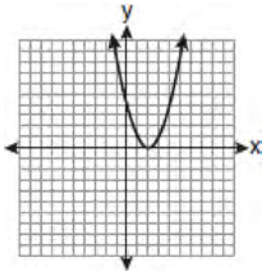
129 If $f(x) = x^2 - 6$, find $f^{-1}(x)$.

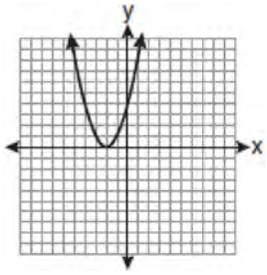
A2.A.46: TRANSFORMATIONS WITH FUNCTIONS AND RELATIONS

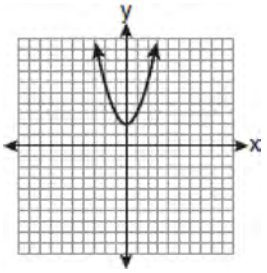
130 The graph below shows the function $f(x)$.

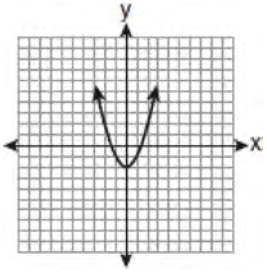



Which graph represents the function $f(x + 2)$?

1 


2 


3 


4 

131 The minimum point on the graph of the equation $y = f(x)$ is $(-1,-3)$. What is the minimum point on the graph of the equation $y = f(x) + 5$?
1 $(-1,2)$
2 $(-1,-8)$
3 $(4,-3)$
4 $(-6,-3)$

# SEQUENCES AND SERIES

## A2.A.29-32: SEQUENCES

132 What is the formula for the $n$th term of the sequence $54, 18, 6, \ldots$?
1 $a_n = 6\left(\frac{1}{3}\right)^n$
2 $a_n = 6\left(\frac{1}{3}\right)^{n-1}$
3 $a_n = 54\left(\frac{1}{3}\right)^n$
4 $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

133 What is a formula for the $n$th term of sequence $B$ shown below?

$$B = 10, 12, 14, 16, \ldots$$

1 $b_n = 8 + 2n$
2 $b_n = 10 + 2n$
3 $b_n = 10(2)^n$
4 $b_n = 10(2)^{n-1}$

134 What is the common difference of the arithmetic sequence $5, 8, 11, 14$?
1 $\frac{8}{5}$
2 $-3$
3 3
4 9

135 Which arithmetic sequence has a common difference of 4?
1 $\{0, 4n, 8n, 12n, \ldots\}$
2 $\{n, 4n, 16n, 64n, \ldots\}$
3 $\{n+1, n+5, n+9, n+13, \ldots\}$
4 $\{n+4, n+16, n+64, n+256, \ldots\}$

136 What is the common ratio of the geometric sequence whose first term is 27 and fourth term is 64?
1 $\frac{3}{4}$
2 $\frac{64}{81}$
3 $\frac{4}{3}$
4 $\frac{37}{3}$

137 What is the fifteenth term of the sequence $5, -10, 20, -40, 80, \ldots$?
1 $-163,840$
2 $-81,920$
3 81,920
4 327,680

138 What is the fifteenth term of the geometric sequence $-\sqrt{5}, \sqrt{10}, -2\sqrt{5}, \ldots$?
1 $-128\sqrt{5}$
2 $128\sqrt{10}$
3 $-16384\sqrt{5}$
4 $16384\sqrt{10}$

139 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

$$a_n = a_{(n-1)} - n$$

A2.N.10, A.34: SIGMA NOTATION

140 The value of the expression $\sum_{r=3}^{5}(-r^2+r)$ is

1 –38
2 –12
3 26
4 62

141 The value of the expression $2\sum_{n=0}^{2}(n^2+2^n)$ is

1 12
2 22
3 24
4 26

142 Evaluate: $10+\sum_{n=1}^{5}(n^3-1)$

143 Mrs. Hill asked her students to express the sum $1+3+5+7+9+\ldots+39$ using sigma notation. Four different student answers were given. Which student answer is correct?

1 $\sum_{k=1}^{20}(2k-1)$
2 $\sum_{k=2}^{40}(k-1)$
3 $\sum_{k=-1}^{37}(k+2)$
4 $\sum_{k=1}^{39}(2k-1)$

144 Express the sum $7+14+21+28+\ldots+105$ using sigma notation.

A2.A.35: SERIES

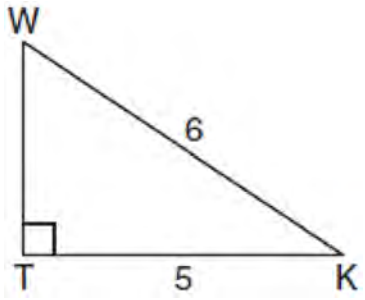
145 An auditorium has 21 rows of seats. The first row has 18 seats, and each succeeding row has two more seats than the previous row. How many seats are in the auditorium?

1 540
2 567
3 760
4 798

# TRIGONOMETRY

A2.A.55: TRIGONOMETRIC RATIOS

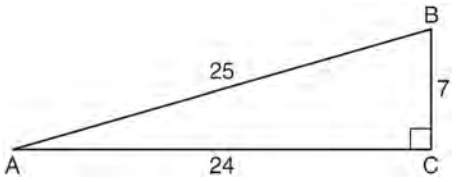
146 In the diagram below of right triangle *KTW*, $KW = 6$, $KT = 5$, and $m\angle KTW = 90$.




What is the measure of $\angle K$, to the *nearest minute*?

1 33°33'
2 33°34'
3 33°55'
4 33°56'

147 Which ratio represents $\csc A$ in the diagram below?



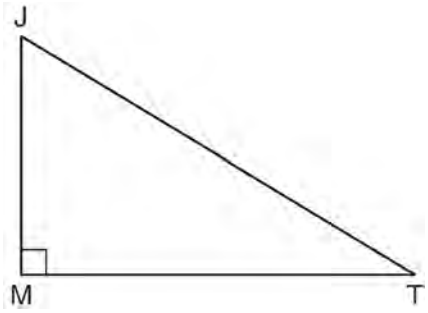

1 $\frac{25}{24}$

2 $\frac{25}{7}$

3 $\frac{24}{7}$

4 $\frac{7}{24}$

148 In the diagram below of right triangle $JTM$, $JT = 12$, $JM = 6$, and $m\angle JMT = 90$.




What is the value of $\cot J$?

1 $\frac{\sqrt{3}}{3}$

2 2

3 $\sqrt{3}$

4 $\frac{2\sqrt{3}}{3}$

A2.M.1-2: RADIAN MEASURE

149 What is the radian measure of the smaller angle formed by the hands of a clock at 7 o'clock?

1 $\frac{\pi}{2}$

2 $\frac{2\pi}{3}$

3 $\frac{5\pi}{6}$

4 $\frac{7\pi}{6}$

150 What is the radian measure of an angle whose measure is –420°?

1 $-\frac{7\pi}{3}$

2 $-\frac{7\pi}{6}$

3 $\frac{7\pi}{6}$

4 $\frac{7\pi}{3}$

151 What is the number of degrees in an angle whose radian measure is $\frac{11\pi}{12}$?

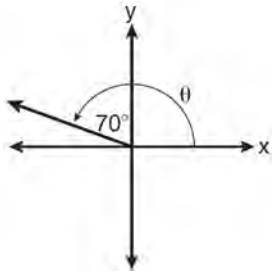
1 150
2 165
3 330
4 518

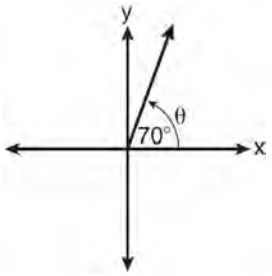
152 Find, to the *nearest minute*, the angle whose measure is 3.45 radians.

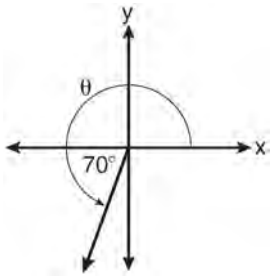
153 Find, to the *nearest tenth of a degree*, the angle whose measure is 2.5 radians.

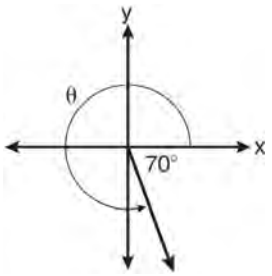
A2.A.60: UNIT CIRCLE

154 In which graph is $\theta$ coterminal with an angle of $-70°$?

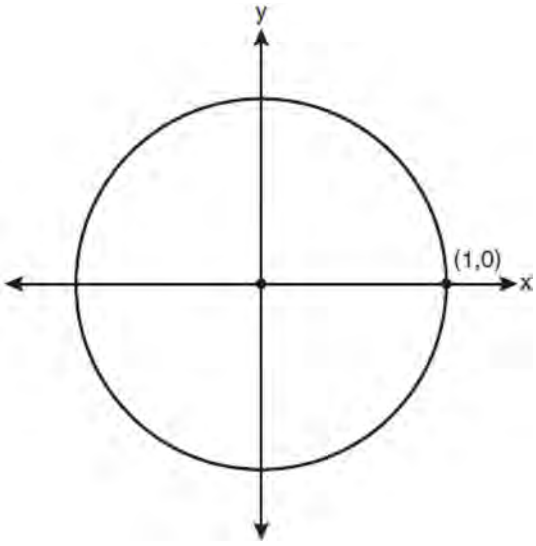
1



2



3



4



155 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240 and find the exact value of $\sin 240°$.




A2.A.62, 66: DETERMINING TRIGONOMETRIC FUNCTIONS

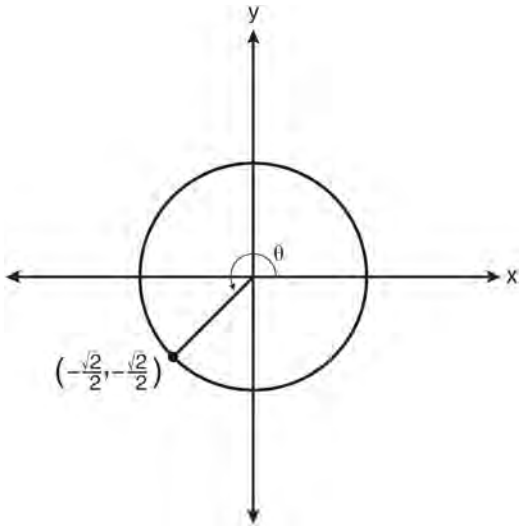
156 The value of $\tan 126°43'$ to the *nearest ten-thousandth* is
1 $-1.3407$
2 $-1.3408$
3 $-1.3548$
4 $-1.3549$

157 If $\theta$ is an angle in standard position and its terminal side passes through the point $(-3, 2)$, find the exact value of $\csc \theta$.

A2.A.64: USING INVERSE TRIGONOMETRIC FUNCTIONS

158 What is the principal value of $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$?
1 $-30°$
2 $60°$
3 $150°$
4 $240°$

159 In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of $\theta$ intersects the unit circle.




What is m$\angle\theta$?
1 45
2 135
3 225
4 240

160 If $\sin^{-1}\left(\frac{5}{8}\right) = A$, then
1 $\sin A = \frac{5}{8}$
2 $\sin A = \frac{8}{5}$
3 $\cos A = \frac{5}{8}$
4 $\cos A = \frac{8}{5}$

A2.A.57: REFERENCE ANGLES

161 Expressed as a function of a positive acute angle, $\cos(-305°)$ is equal to
1 $-\cos 55°$
2 $\cos 55°$
3 $-\sin 55°$
4 $\sin 55°$

A2.A.61: ARC LENGTH

162 A circle has a radius of 4 inches. In inches, what is the length of the arc intercepted by a central angle of 2 radians?
1 $2\pi$
2 2
3 $8\pi$
4 8

A2.A.58: COFUNCTION AND RECIPROCAL TRIGONOMETRIC FUNCTIONS

163 If $\angle A$ is acute and $\tan A = \frac{2}{3}$, then
1 $\cot A = \frac{2}{3}$
2 $\cot A = \frac{1}{3}$
3 $\cot(90° - A) = \frac{2}{3}$
4 $\cot(90° - A) = \frac{1}{3}$

164 The expression $\frac{\sin^2\theta + \cos^2\theta}{1 - \sin^2\theta}$ is equivalent to
1 $\cos^2\theta$
2 $\sin^2\theta$
3 $\sec^2\theta$
4 $\csc^2\theta$

A2.A.67: PROVING TRIGONOMETRIC IDENTITIES

165 Starting with $\sin^2 A + \cos^2 A = 1$, derive the formula $\tan^2 A + 1 = \sec^2 A$.

A2.A.76: ANGLE SUM AND DIFFERENCE IDENTITIES

166 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to
1 $\sin x$
2 $\sin 7x$
3 $\cos x$
4 $\cos 7x$

167 If $\tan A = \frac{2}{3}$ and $\sin B = \frac{5}{\sqrt{41}}$ and angles $A$ and $B$ are in Quadrant I, find the value of $\tan(A + B)$.

168 Express as a single fraction the exact value of $\sin 75°$.

A2.A.77: DOUBLE AND HALF ANGLE IDENTITIES

169 The expression $\cos^2\theta - \cos 2\theta$ is equivalent to
1 $\sin^2\theta$
2 $-\sin^2\theta$
3 $\cos^2\theta + 1$
4 $-\cos^2\theta - 1$

170 If $\sin A = \frac{2}{3}$ where $0° < A < 90°$, what is the value of $\sin 2A$?
1 $\frac{2\sqrt{5}}{3}$
2 $\frac{2\sqrt{5}}{9}$
3 $\frac{4\sqrt{5}}{9}$
4 $-\frac{4\sqrt{5}}{9}$

A2.A.68: TRIGONOMETRIC EQUATIONS

171 What are the values of $\theta$ in the interval $0° \le \theta < 360°$ that satisfy the equation $\tan\theta - \sqrt{3} = 0$?
1 60º, 240º
2 72º, 252º
3 72º, 108º, 252º, 288º
4 60º, 120º, 240º, 300º

172 Solve the equation $2\tan C - 3 = 3\tan C - 4$ algebraically for all values of $C$ in the interval $0° \le C < 360°$.

173 Find all values of $\theta$ in the interval $0° \le \theta < 360°$ that satisfy the equation $\sin 2\theta = \sin\theta$.

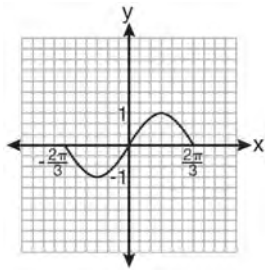
A2.A.69: PROPERTIES OF TRIGONOMETRIC FUNCTIONS

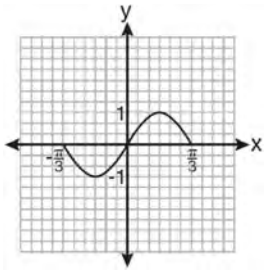
174 What is the period of the function $f(\theta) = -2\cos 3\theta$?
1 $\pi$
2 $\frac{2\pi}{3}$
3 $\frac{3\pi}{2}$
4 $2\pi$

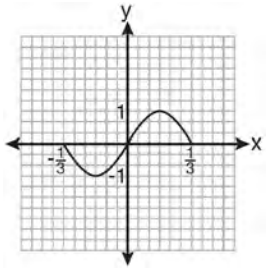
175 What is the period of the function $y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$?
1 $\frac{1}{2}$
2 $\frac{1}{3}$
3 $\frac{2}{3}\pi$
4 $6\pi$

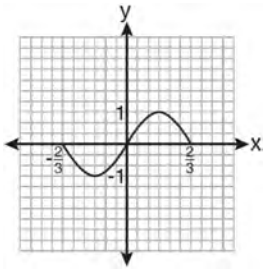
A2.A.65, 70-71: GRAPHING TRIGONOMETRIC FUNCTIONS

176 Which graph represents one complete cycle of the equation $y = \sin 3\pi x$?

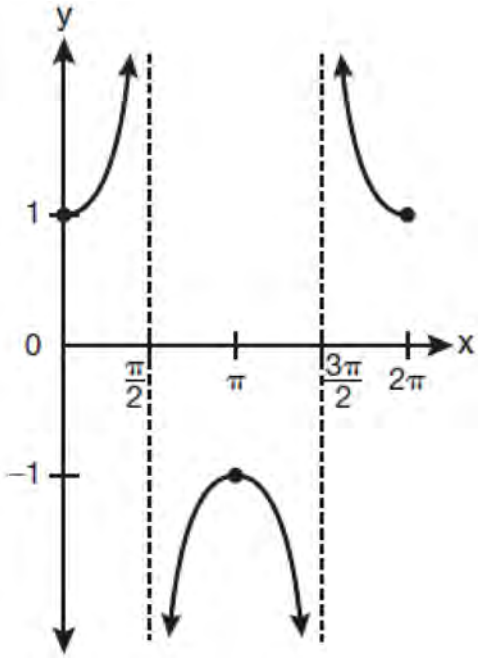
1 


2 


3 

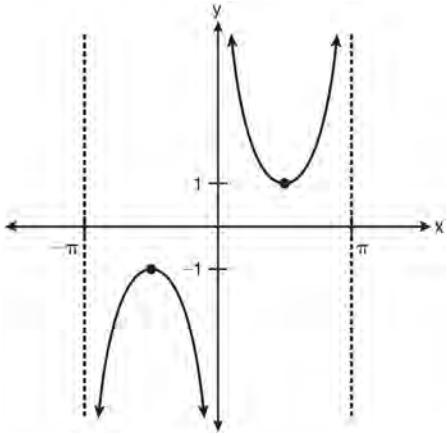

4 


177 Which equation is represented by the graph below?



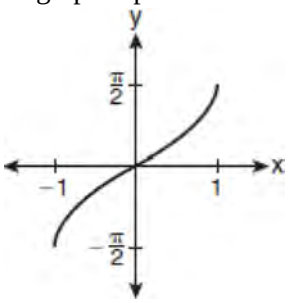

1 $y = \cot x$
2 $y = \csc x$
3 $y = \sec x$
4 $y = \tan x$

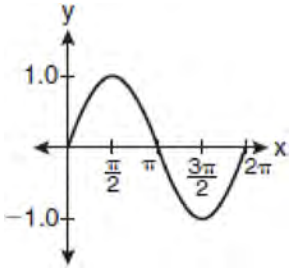
178 Which equation is sketched in the diagram below?

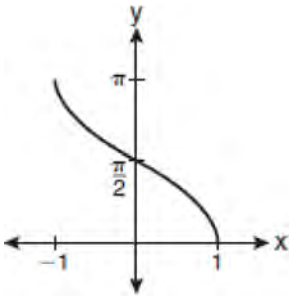


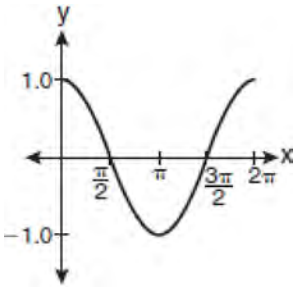

1 $y = \csc x$
2 $y = \sec x$
3 $y = \cot x$
4 $y = \tan x$

179 Which graph represents the equation $y = \cos^{-1} x$?

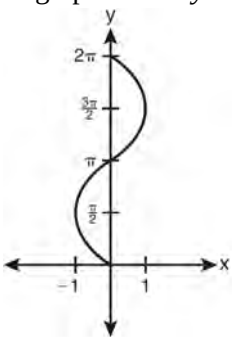
1 

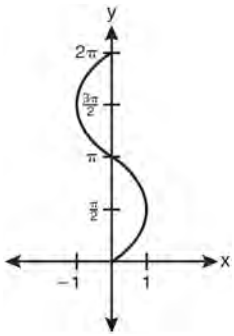

2 

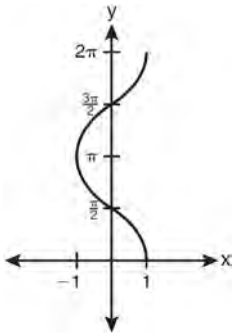

3 

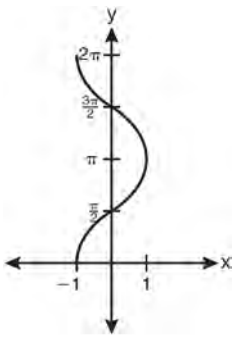

4 


180 Which graph shows $y = \cos^{-1} x$?

1 


2 


3 


4 

A2.A.63: DOMAIN AND RANGE

181 The function $f(x) = \tan x$ is defined in such a way that $f^{-1}(x)$ is a function. What can be the domain of $f(x)$?
1 $\{x \mid 0 \le x \le \pi\}$
2 $\{x \mid 0 \le x \le 2\pi\}$
3 $\left\{x \mid -\frac{\pi}{2} < x < \frac{\pi}{2}\right\}$
4 $\left\{x \mid -\frac{\pi}{2} < x < \frac{3\pi}{2}\right\}$

A2.A.74: USING TRIGONOMETRY TO FIND AREA

182 In $\triangle ABC$, $m\angle A = 120$, $b = 10$, and $c = 18$. What is the area of $\triangle ABC$ to the *nearest square inch*?
1 52
2 78
3 90
4 156

183 The sides of a parallelogram measure 10 cm and 18 cm. One angle of the parallelogram measures 46 degrees. What is the area of the parallelogram, to the *nearest square centimeter*?
1 65
2 125
3 129
4 162

184 Two sides of a parallelogram are 24 feet and 30 feet. The measure of the angle between these sides is 57°. Find the area of the parallelogram, to the *nearest square foot*.

A2.A.73: LAW OF SINES

185 In $\triangle ABC$, $m\angle A = 32$, $a = 12$, and $b = 10$. Find the measures of the missing angles and side of $\triangle ABC$. Round each measure to the *nearest tenth*.

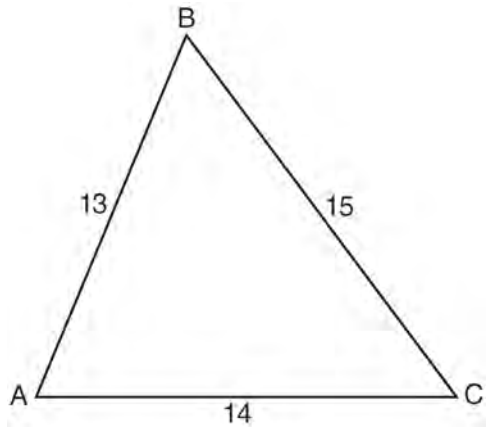
A2.A.75: LAW OF SINES-THE AMBIGUOUS CASE

186 How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?
1 1
2 2
3 3
4 0

187 In $\triangle ABC$, $m\angle A = 74$, $a = 59.2$, and $c = 60.3$. What are the two possible values for $m\angle C$, to the *nearest tenth*?
1 73.7 and 106.3
2 73.7 and 163.7
3 78.3 and 101.7
4 78.3 and 168.3

A2.A.73: LAW OF COSINES

188 In $\triangle ABC$, $a = 15$, $b = 14$, and $c = 13$, as shown in the diagram below. What is the $m\angle C$, to the *nearest degree*?




1 53
2 59
3 67
4 127

189 In $\triangle ABC$, $a = 3$, $b = 5$, and $c = 7$. What is $m\angle C$?
1 22
2 38
3 60
4 120

190 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80°. Find, to the *nearest degree*, the measure of the smallest angle in the triangle.

A2.A.73: VECTORS

191 Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55°. Find the magnitude of the resultant force, to the *nearest hundredth of a newton*. Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.

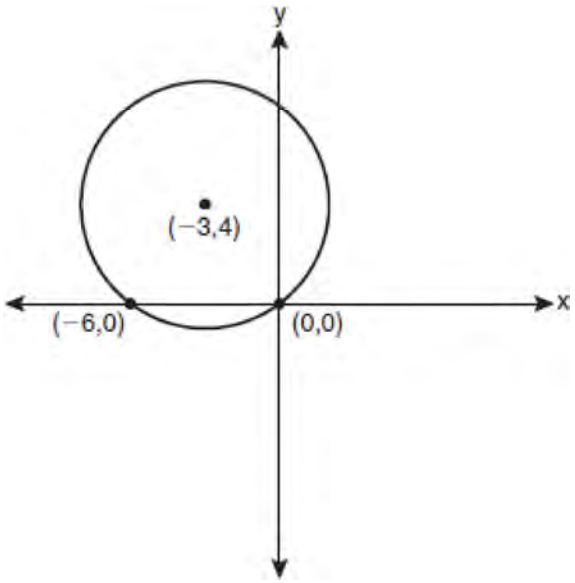
# CONICS

A2.A.47, 49: EQUATIONS OF CIRCLES

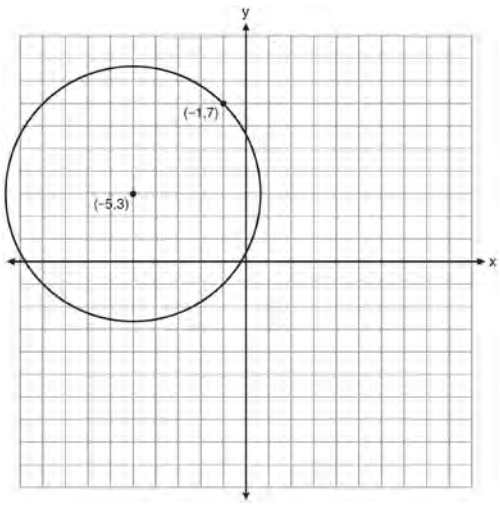
192 The equation $x^2 + y^2 - 2x + 6y + 3 = 0$ is equivalent to

1 $(x-1)^2 + (y+3)^2 = -3$
2 $(x-1)^2 + (y+3)^2 = 7$
3 $(x+1)^2 + (y+3)^2 = 7$
4 $(x+1)^2 + (y+3)^2 = 10$

193 Write an equation of the circle shown in the graph below.

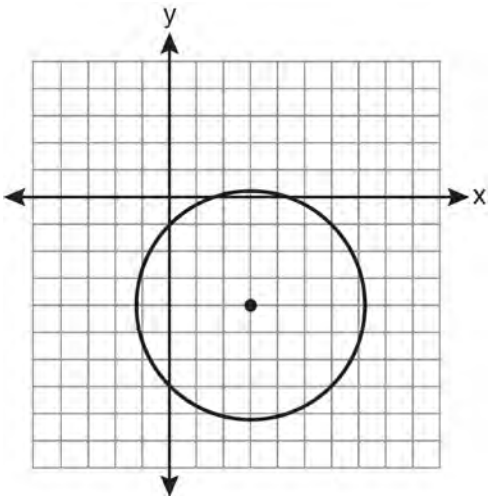



194 A circle shown in the diagram below has a center of $(-5,3)$ and passes through point $(-1,7)$.




Write an equation that represents the circle.

195 Which equation represents the circle shown in the graph below that passes through the point $(0,-1)$?




1 $(x-3)^2 + (y+4)^2 = 16$
2 $(x-3)^2 + (y+4)^2 = 18$
3 $(x+3)^2 + (y-4)^2 = 16$
4 $(x+3)^2 + (y-4)^2 = 18$