1. 060001a, P.I. 8.G.19
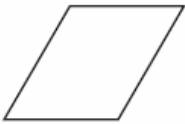
Which inequality is represented in the graph below?

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

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

2. 060002a

Which geometric figure has one and only one line of symmetry?

[A]

Rhombus

[B]

Square

[C]

Rectangle

[D]

Isosceles trapezoid

3. 060003a, P.I. 7.N.2

Which number is rational?

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

4. 060004a, P.I. A.A.7

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] 35   [B] 40   [C] 45   [D] 55

5. 060005a, P.I. A.A.12

The quotient of $-\dfrac{15x^8}{5x^2}$, $x \neq 0$, is

[A] $-10x^4$ [B] $-3x^4$

[C] $-3x^6$ [D] $-10x^6$

6. 060006a, P.I. G.G.26

What is the inverse of the statement "If it is sunny, I will play baseball"?

[A] If it is not sunny, I will not play baseball.

[B] If I play baseball, then it is sunny.

[C] I will play baseball if and only if it is sunny.

[D] If I do not play baseball, then it is not sunny.

7. 060007a, P.I. A.A.10

Which ordered pair is the solution of the following system of equations?
$3x + 2y = 4$
$-2x + 2y = 24$

[A] (2,-5)   [B] (2,-1)

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

8. 060008a

Which equation represents a circle whose center is (3, -2)?

[A] $(x-3)^2 + (y+2)^2 = 4$

[B] $(x+3)^2 + (y-2)^2 = 4$

[C] $(x-2)^2 + (y+3)^2 = 4$

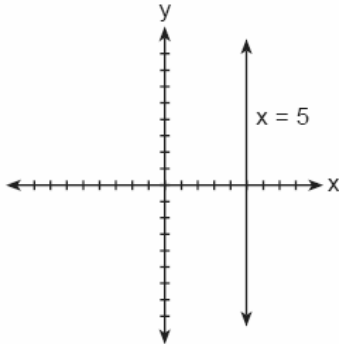[D] $(x+2)^2 + (y-3)^2 = 4$

9. 060009a, P.I. G.G.48

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

[A] {6,12,13}   [B] {8,15,17}

[C] {6,7,8}   [D] {6,8,12}

10. 060010a, P.I. A.A.6

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

11. 060011a, P.I. A.N.1

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

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

[C] $x = a$ [D] $x = 1 - a$

12. 060012a, P.I. A.A.37

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

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

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

13. 060013a

Which transformation does *not* always produce an image that is congruent to the original figure?

[A] rotation   [B] translation

[C] reflection   [D] dilation

14. 060014a, P.I. A.A.1

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

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

15. 060015a, P.I. A.A.13

The expression $(x-6)^2$ is equivalent to

[A] $x^2 - 12x + 36$ [B] $x^2 + 36$

[C] $x^2 - 36$ [D] $x^2 + 12x + 36$

16. 060016a, P.I. A.N.8

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] 120   [B] 60   [C] 20   [D] 24

17. 060017a, P.I. A.A.6

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

18. 060018a, P.I. A.A.11

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

[C] (-2, -5)   [D] (1, 4)

19. 060019a, P.I. A.A.13

If $2x^2 - 4x + 6$ is subtracted from $5x^2 + 8x - 2$, the difference is

[A] $-3x^2 - 12x + 8$ [B] $-3x^2 + 4x + 4$

[C] $3x^2 + 12x - 8$ [D] $3x^2 + 4x + 4$

20. 060020a, P.I. A2.A.8

What is the value of 3^{-2} ?

[A] 9   [B] -9   [C] $\dfrac{1}{9}$ [D] $-\dfrac{1}{9}$
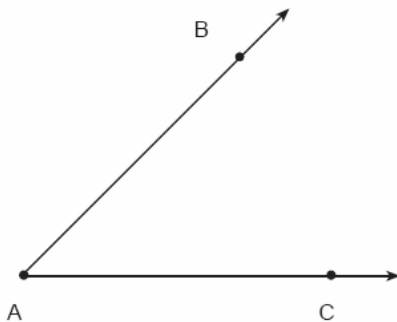
21. 060021a, P.I. A.M.2

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

22. 060022a, P.I. G.G.17

Using only a ruler and compass, construct the bisector of angle *BAC* in the accompanying diagram.
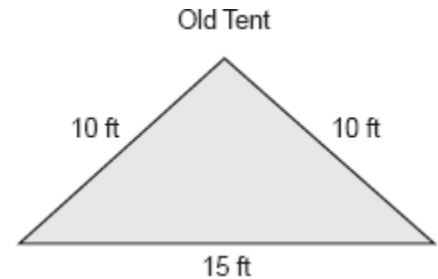

23. 060023a, P.I. A.N.8

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?

24. 060024a, P.I. G.G.45

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.

Old Tent

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?

25. 060025a

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?

Yearly Total Cost

26. 060026a, P.I. A.RP.11

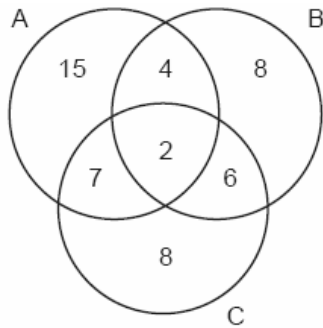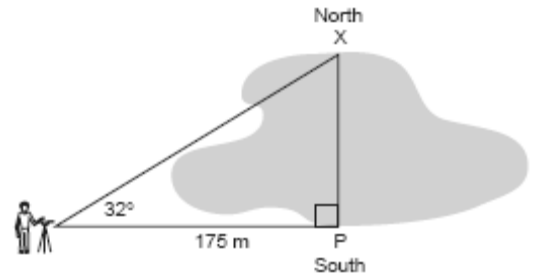The accompanying Venn diagram shows the number of students who take various courses. All students in circle A take mathematics. All in circle B take science. All in circle C take technology. What percentage of the students take mathematics or technology?

27. 060027a, P.I. G.G.31

Hersch says if a triangle is an obtuse triangle, then it cannot also be an isosceles triangle. Using a diagram, show that Hersch is incorrect, and indicate the measures of all the angles and sides to justify your answer.

28. 060028a, P.I. G.G.16

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?

29. 060029a, P.I. A.N.4

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*.
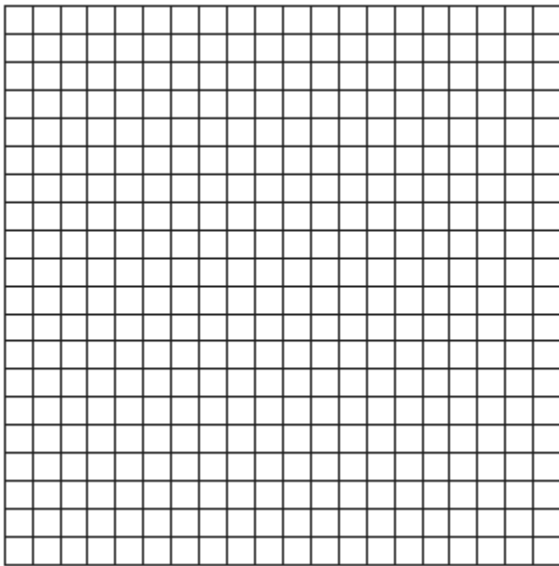
30. 060030a, P.I. A.A.44

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*.

31. 060031a, P.I. A.A.7

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?

32. 060032a, P.I. G.G.22

A treasure map shows a treasure hidden in a park near a tree and a statue. The map indicates that the tree and the statue are 10 feet apart. The treasure is buried 7 feet from the base of the tree and also 5 feet from the base of the statue. How many places are possible locations for the treasure to be buried? Draw a diagram of the treasure map, and indicate with an **X** *each* possible location of the treasure.

33. 060033a, P.I. A.S.5

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		

34. 060034a, P.I. A2.S.12

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.

35. 060035a, P.I. A.A.8

The area of the rectangular playground enclosure at South School is 500 square meters. The length of the playground is 5 meters longer than the width. Find the dimensions of the playground, in meters. [*Only an algebraic solution will be accepted.*]

[1] B

[2] D

[3] B

[4] B

[5] C

[6] A

[7] D

[8] A

[9] B

[10] B

[11] B

[12] D

[13] D

[14] A

[15] A

[16] A

[17] B

[18] C

[19] C

[20] C

[2] 18 and correct substitution, $F = \dfrac{9}{5}(-8) + 32$, is shown.
[1] A correct substitution method is shown, but one computational error is made.
or [1] The answer is not rounded to the nearest integer, such as 17.6 or 17 .
or [1] The student substitutes -8 for F, but then solves appropriately for C.
or [1] The student substitutes +8 for C, but then solves appropriately for F.
or [1] 18 but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[21]   incorrect procedure.

[2] A correct construction is drawn to find the midpoint of $\overline{BC}$, showing both sets of arcs and a line connecting A with the midpoint.
[1] A correct construction is drawn to find the midpoint of $\overline{BC}$, but the median is not drawn.
or [1] The construction is appropriate, but a compass and a straightedge are not used.
[0] No construction arcs are shown.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[22]   obviously incorrect procedure.

[2] 8,100 and appropriate work is shown, such as $9 \times 10 \times 10 \times 9$.
[1] 10,000 but appropriate work is shown.
or [1] Appropriate work is shown, but the student multiplies incorrectly.
or [1] An appropriate pattern is shown, such as $9 \times 10 \times 10 \times 9$.
or [1] 8,100 but no work is shown.
[0] 38 is shown.
or [0] The student attempts to use the counting principle, but adds.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[23]   obviously incorrect procedure.

[2] 24 feet and appropriate work is shown, such as $\frac{10}{15} = \frac{16}{x}$ or $= \frac{10}{16} = \frac{15}{x}$.

[1] An appropriate proportion is shown, but an incorrect solution or no solution is found.

or [1] An incorrect proportion of equal difficulty is shown, but an appropriate solution for the proportion written is found.

or [1] 24 feet but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[24] _____

[2] $390 or 390 and appropriate work is shown, such as a numerical table or the equation y = 30x + 90 or the expression 90 + 30N.

[1] Appropriate work is shown, but one computational error is made.

or [1] $300 or 300 or a slope of 30 but appropriate work is shown.

or [1] $390 or 390 but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[25] _____

[3] 84% and appropriate work is shown, such as mathematics or technology = 42, the total = 50, and the percentage = 84%.

[2] The correct numbers of students are shown, but the percentage is incorrect.

or [2] One error in computing the numbers of students is made, but the percentage is appropriate for those numbers.

[1] Only one number is correct, such as 28 taking mathematics.

or [1] An appropriate percentage is shown for two incorrect values.

or [1] 84% but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[26] _____

[3] The student draws an obtuse triangle and all sides and all angles are correctly calculated, such as by using 120°, 30°, and 30° and sides 4, 4, and 10.

[2] The student has the angles correctly indicated and the two congruent sides marked, but the length of the longest side is incorrect or is missing.

or [2] All sides are correctly marked, but the angles do not add to 180°, but an obtuse angle and two congruent angles are shown.

[1] Only the angles are correctly shown.

or [1] Only the sides are correctly shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[27] _____

[3] 5-inch box and appropriate work is shown, including showing a diameter between 4 and 5.

[2] The correct diameter is shown, but the wrong box size is chosen.

or [2] The correct radius is shown, but the 3-inch box is chosen.

[1] The correct diameter or radius is shown, but no box is chosen.

or [1] An appropriate radius between 2 and 3 is shown, using the incorrect formula $A = \pi r^2$, and the 3-inch box is chosen.

or [1] An appropriate diameter, using $A = \pi r^2$, is shown, but the appropriate box is chosen.

or [1] An appropriate radius, using $A = \pi r^2$, is shown, but no box is chosen.

or [1] The 5-inch box is chosen, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[28] _____

[3] 499 days and appropriate work is shown, such as $\dfrac{17,000,000\,miles}{1420\dfrac{miles}{hour} \times 24\dfrac{hours}{day}}$.

[2] Appropriate work is shown, but one computational error is made or the student incorrectly calculates 1.7×10^7 by one decimal place.

or [2] Appropriate work is shown, but the answer is rounded incorrectly or is not rounded.

[1] $1.7 \times 10^7 = 17,000,000$ is shown.

or [1] $\dfrac{1.7 \times 10^7}{1420} = 11,971.831$ hours is shown.

or [1] 34,080 miles in 1 day is shown.

or [1] 499 but no work is shown.

[0] The student does not understand scientific notation.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[29] obviously incorrect procedure.

[3] 109 meters and appropriate work is shown by using an appropriate trigonometric ratio, such as $\tan 32° = \dfrac{y}{175}$.

[2] 109 meters but one rounding error is made.

or [2] The student uses an appropriate trigonometric function with an inverted ratio, such as $\tan 32° = \dfrac{175}{y}$, but completes the calculation appropriately, such as showing 280 meters.

[1] The student uses an incorrect trigonometric ratio but completes the calculation appropriately.

or [1] The student uses an inverted tangent ratio and makes one computational or rounding error.

or [1] The student uses the correct trigonometric ratio but solves it incorrectly or does not solve it at all.

or [1] 109 meters but no work or explanation is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[30] incorrect procedure.

[4] 65 adult tickets and 85 student tickets and an appropriate equation is shown, such as $7.50x + 4.75(150 - x) = 891.25$, or any other acceptable method is used.
[3] Either 65 or 85 and appropriate work is shown.
or [3] Appropriate work is shown, but one computational error is made that leads to two appropriate answers.
[2] An incorrect equation is shown, but it is solved appropriately for two answers.
or [2] The correct equation is shown, but two computational errors are made.
[1] Appropriate work is shown, but no answer is found.
or [1] 65 and 85 but no work is shown.
[0] Either 65 or 85 and no work is shown.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[31] obviously incorrect procedure.

[4] A correct diagram is drawn, two X points are marked, a numerical 2 is given for the places to dig, and appropriate work is shown.
[3] The diagram is correct including two X points, but an incorrect answer or no answer is found.
[2] One correct locus situation and one incorrect locus situation are drawn, but the answer is appropriate according to the diagram.
or [2] Each locus situation is correctly drawn, but no X points are marked, and no numerical answer is found.
[1] Only one locus situation is correctly drawn and an incorrect conclusion or no conclusion is shown.
or [1] 2 but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[32] incorrect procedure.

[4] A correct table and histogram with appropriate labels and scales are shown, such as
the table below.

SCORE	TALLY	FREQUENCY
40-49	/	1
50-59	/	1
60-69	///	3
70-79	///	3
80-89	///	3

[3] An incorrect table is shown, but the histogram is appropriate, based on this table.
or [3] A correct table is shown, but one error is made on the histogram, such as using incorrect labels or no labels.
or [3] An incomplete table is shown, but the histogram is correct.
[2] An incomplete table is shown, and the histogram is partially correct.
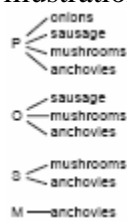or [2] A correct table is shown, and a correct bar graph is made.
[1] A correct table is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[33] incorrect procedure.

[4] $\frac{4}{10}$ and appropriate work is shown, such as the following illustration or any other correct method:

[3] Appropriate work is shown, but one computational error is made.

or [3] Appropriate work and complement $\frac{6}{10}$ are shown.

or [3] Appropriate work is shown, but the answer is incomplete.

[2] $_5C_2$ and the work is appropriate but incomplete.

or [2] 10 but appropriate work is shown.

or [2] A correct sample space or tree diagram is shown.

[1] Incorrect work leading to $0 \leq$ fraction ≤ 1 or $0 \leq$ percent ≤ 100 is shown.

or [1] $\frac{4}{10}$ but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[34] incorrect procedure.

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[4] Width $= 20$ and length $= 25$ and an appropriate algebraic equation is shown, such as $x^2 + 5x - 500 = 0$.

[3] A correct quadratic equation is shown, but one error is made.

or [3] A correct quadratic equation is shown, but solved for only one dimension.

[2] An appropriate solution is shown, but the student fails to reject the negative root and finds two sets of dimensions.

or [2] The quadratic equation $(5x)(x) = 500$ is solved appropriately for both dimensions, $x = 10$ and $5x = 50$.

[1] The student writes only the correct quadratic equation or only the equation $x(x + 5) = 500$ or fails to solve the equation correctly.

or [1] The student writes a linear equation from $x(x + 5) = 500$, such as $2x + 5x = 500$, but solves that equation appropriately.

or [1] A correct equation is shown for the perimeter and solved appropriately.

or [1] $(5x)(x) = 500$ is solved correctly for only one dimension.

or [1] 20 and 25 but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[35] incorrect procedure.