1. 060601a, P.I. 8.G.1
In the accompanying diagram, line *a* intersects line *b*.

What is the value of *x*?

[A] 10 [B] -10 [C] 5 [D] 90

2. 060602a, P.I. A.A.22
What is the value of *x* in the equation $13x-2(x+4)=8x+1$?

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

3. 060603a, P.I. G.G.58
One function of a movie projector is to enlarge the image on the film. This procedure is an example of a

[A] line reflection [B] dilation

[C] translation [D] line of symmetry

4. 060604a, P.I. A.A.12
What is the product of $\frac{1}{3}x^2y$ and $\frac{1}{6}xy^3$?

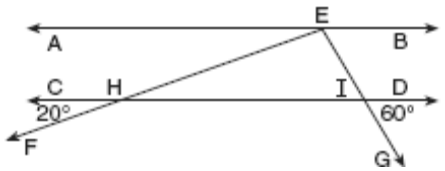
[A] $\frac{1}{9}x^3y^4$ [B] $\frac{1}{2}x^2y^3$

[C] $\frac{1}{18}x^3y^4$ [D] $\frac{1}{18}x^2y^3$

5. 060605a, P.I. A.N.6
What is the value of $\frac{8!}{4!}$?

[A] 2 [B] 4! [C] 1,680 [D] 2!

6. 060606a, P.I. G.G.36
In the accompanying diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$. From point *E* on $\overleftrightarrow{AB}$, transversals $\overleftrightarrow{EF}$ and $\overleftrightarrow{EG}$ are drawn, intersecting $\overleftrightarrow{CD}$ at *H* and *I*, respectively.



If $m\angle CHF = 20$ and $m\angle DIG = 60$, what is $m\angle HEI$?

[A] 80 [B] 100 [C] 120 [D] 60

7. 060607a, P.I. A2.S.9
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] ${}_{12}P_3$ [B] $5\cdot3\cdot4$

[C] $5+3+4$ [D] ${}_{12}C_3$

8. 060608a
What is the length of one side of the square whose perimeter has the same numerical value as its area?

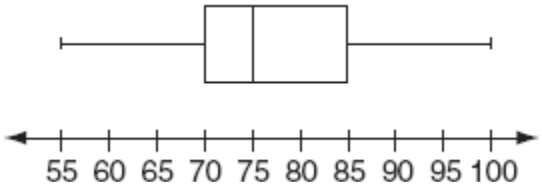
[A] 3 [B] 6 [C] 4 [D] 5

9. 060609a, P.I. 7.N.3
Which list is in order from smallest value to largest value?

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

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

10. 060610a, P.I. A.S.6
The accompanying box-and-whisker plot represents the scores earned on a science test.



What is the median score?

[A] 85 [B] 70 [C] 75 [D] 77

11. 060611a, P.I. A.G.1
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] $x+5$ [B] x^2-x-6

[C] $3x-1$ [D] $2x-1$

12. 060612a, P.I. A.A.26
What is the value of x in the equation $\frac{x}{2x+1}=\frac{4}{3}$?

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

13. 060613a, P.I. A.A.36
Which statement describes the graph of $x=4$?

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

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

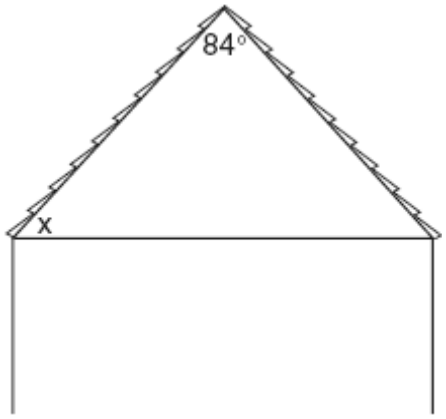
[C] It is parallel to the *x*-axis.

[D] It has a slope of 4.

14. 060614a, P.I. G.G.25
Given the statement: "If x is a rational number, then $\sqrt{x}$ is irrational." Which value of x makes the statement *false*?

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

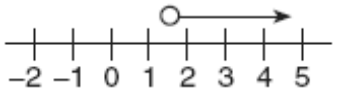
15. 060615a, P.I. G.G.31
The accompanying diagram shows the roof of a house that is in the shape of an isosceles triangle. The vertex angle formed at the peak of the roof is 84°.

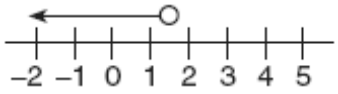


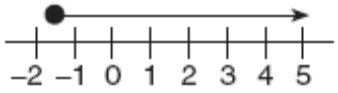
What is the measure of x?

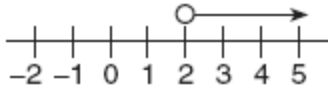
[A] 48° [B] 96° [C] 84° [D] 138°

16. 060616a, P.I. 8.G.19
Which graph best represents the solution set for the inequality $x>\sqrt{2}$?

[A]


[B]


[C]


[D]


17. 060617a, P.I. A.A.23
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] $\frac{V}{\pi r^2}$ [B] $\frac{V}{\pi} r^2$

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

18. 060618a
If a line is horizontal, its slope is

[A] negative [B] 0

[C] undefined [D] 1

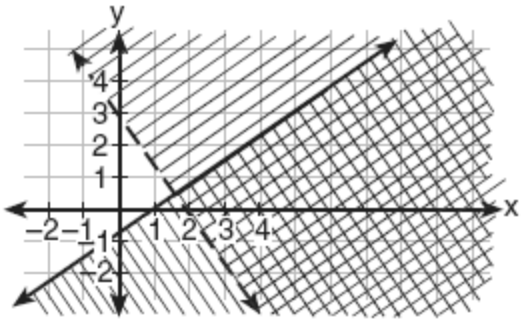
19. 060619a, P.I. G.G.22
Chantrice is pulling a wagon along a smooth, horizontal street. The path of the center of one of the wagon wheels is best described as

[A] two parallel lines [B] a circle

[C] a line parallel to the road

[D] a line perpendicular to the road

20. 060620a, P.I. A.A.40
Which coordinate point is in the solution set for the system of inequalities shown in the accompanying graph?



[A] (3,1) [B] (0,1)

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

21. 060621a, P.I. 8.G.3
The measures of two complementary angles are represented by $(3x+15)$ and $(2x-10)$. What is the value of x?

[A] 19 [B] 17 [C] 37 [D] 35

22. 060622a, P.I. G.G.25
If $x = 3$, which statement is *false*?

[A] x is odd and $2x$ is even.

[B] x is not prime and x is odd.

[C] x is prime and x is odd.

[D] x is odd or x is even.

23. 060623a, P.I. A.A.20
Factored completely, the expression $2y^2 + 12y - 54$ is equivalent to

[A] $(2y + 6)(y - 9)$ [B] $(y + 6)(2y - 9)$

[C] $2(y + 9)(y - 3)$ [D] $2(y - 3)(y - 9)$

24. 060624a, P.I. A.N.1
Which statement best illustrates the additive identity property?

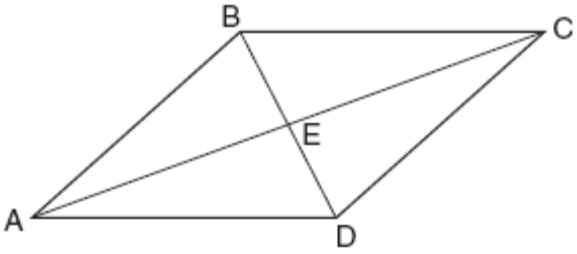
[A] 6(2) = 2(6) [B] 6 + (-6) = 0

[C] 6 + 2 = 2 + 6 [D] 6 + 0 = 6

25. 060625a, P.I. A.A.17
The expression $\frac{5x}{6} + \frac{x}{4}$ is equivalent to

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

26. 060626a, P.I. G.G.38
In the accompanying diagram of parallelogram *ABCD*, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*, $BE = \frac{2}{3}x$, and $ED = x - 10$.



What is the value of *x*?

[A] 30 [B] -30 [C] 6 [D] -6

27. 060627a, P.I. A.N.3
Expressed in simplest radical form, the product of $\sqrt{6} \cdot \sqrt{15}$ is

[A] $3\sqrt{15}$ [B] $3\sqrt{10}$

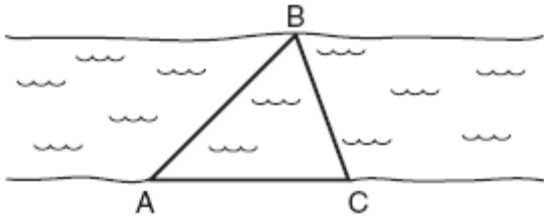
[C] $9\sqrt{10}$ [D] $\sqrt{90}$

28. 060628a
What is the sum of 6×10^3 and 3×10^2 ?

[A] 18×10^5 [B] 9×10^5

[C] 6.3×10^3 [D] 9×10^6

29. 060629a, P.I. G.G.34
On the banks of a river, surveyors marked locations *A*, *B*, and *C*. The measure of $\angle ACB = 70°$ and the measure of $\angle ABC = 65°$.



Which expression shows the relationship between the lengths of the sides of this triangle?

[A] $BC < AC < AB$ [B] $AC < AB < BC$

[C] $BC < AB < AC$ [D] $AB < BC < AC$

30. 060630a, P.I. A.S.20
Which inequality represents the probability, *x*, of any event happening?

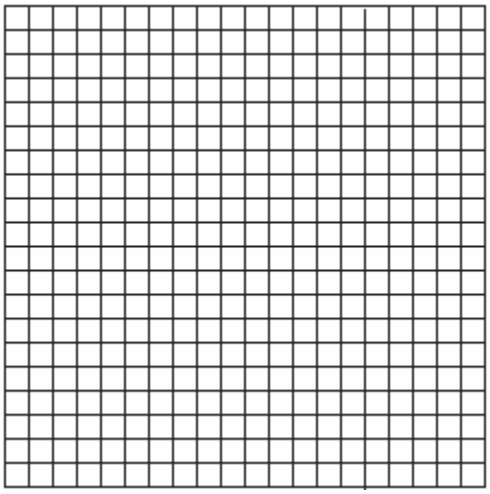
[A] $x \geq 0$ [B] $0 \leq x \leq 1$

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

31. 060631a, P.I. A.G.1
Determine the area, in square feet, of the *smallest* square that can contain a circle with a radius of 8 feet.

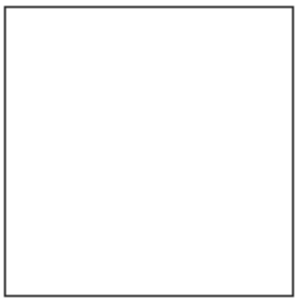
32. 060632a, P.I. A2.S.11
Five friends met for lunch, and they all shook hands. Each person shook the other person's right hand only once. What was the total number of handshakes?

33. 060633a
Two hikers started at the same location. One traveled 2 miles east and then 1 mile north. The other traveled 1 mile west and then 3 miles south. At the end of their hikes, how many miles apart are the two hikers? [The use of the accompanying grid is optional.]



34. 060634a, P.I. A.A.22
Solve for x: $3.3 - x = 3(x - 1.7)$

35. 060635a
On the accompanying square, draw all the lines of symmetry.



36. 060636a, P.I. A.A.8
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?

37. 060637a, P.I. 6.S.5
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.

38. 060638a, P.I. A.A.7
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?

39. 060639a, P.I. A.A.44
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*?

[1] A

[2] C

[3] B

[4] C

[5] C

[6] B

[7] B

[8] C

[9] B

[10] C

[11] C

[12] C

[13] B

[14] D

[15] A

[16] A

[17] A

[18] B

[19] C

[20] A

[21] B

[22] B

[23] C

[24] D

[25] D

[26] A

[27] B

[28] C

[29] A

[30] B

[31]
[2] 256, and appropriate work is shown, such as finding the side of the square and calculating the area.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] Appropriate work is shown, but only the area of the circle is found.
or [1] An incorrect value for the side of the square is determined, but an appropriate area is found.
or [1] A correct value for the side of the square is determined, but the area is not found or is found incorrectly.
or [1] The area for the square inscribed in the circle is found, resulting in an answer of 128.
or [1] 256, 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.

[32]
[2] 10, and appropriate work is shown, such as ${}_5C_2$ or a diagram or a list.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 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 incorrect procedure.

[2] 5, and appropriate work is shown, such as the distance formula, the Pythagorean theorem, or a Pythagorean triple.
[1] Appropriate work is shown, but one computational or graphing error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] A correct equation is written, but no further correct work is shown.
or [1] 5, 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.

[33]

[2] 2.1, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 2.1, 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.

[34]

[2] The four correct lines of symmetry are drawn.
[1] At least two correct lines of symmetry are drawn, and no inappropriate lines are drawn.
or [1] All four correct lines of symmetry are drawn, but one or more inappropriate lines are also drawn.
[0] At least one of the correct lines of symmetry is missing, and one or more inappropriate lines are drawn.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[35]

[3] 5, and appropriate work is shown, such as the quadratic equation $(x + 7)(x - 3) = 24$ or trial and error with at least three trials and appropriate checks.
[2] A correct quadratic equation is written, but one computational error is made in finding Tamara's age.
or [2] 12 and 2 are found as the sisters' ages, but Tamara's age is not found.
or [2] The trial-and-error method is used to find the correct solution, but only two trials and appropriate checks are shown.
[1] Appropriate work is shown, but two or more computational errors are made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] A correct quadratic equation is written, but no further correct work is shown.
or [1] An incorrect equation of equal difficulty is solved appropriately for Tamara's age.
or [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.
or [1] 5, but no work or only one trial with an appropriate check 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.

[36]

[3] Mean = 79, median = 79, and mode = 78, and appropriate work is shown.
[2] Appropriate work is shown, but only two of the three measures of central tendency are determined and identified correctly.
or [2] Appropriate work is shown and all three measures of central tendency are determined correctly, but the measures are not identified or are identified incorrectly.
[1] Appropriate work is shown, but only one of the three measures of central tendency is determined and identified correctly.
or [1] Mean = 79, median = 79, and mode = 78, but no work is shown.
[0] 79, 79, and 78, but no work is shown, and the answers are not identified or are identified incorrectly.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[37]

[4] 17 nickels and 15 dimes, and appropriate work is shown, such as the equation $0.05x + 0.10(32 - x) = 2.35$ or trial and error with at least three trials and appropriate checks.
[3] Appropriate work is shown, but one computational error is made.
or [3] Appropriate work is shown, and the correct answers are found, but they are not labeled or are labeled incorrectly.
or [3] Appropriate work is shown, but only the correct number of nickels or the correct number of dimes is found and labeled.
[2] Appropriate work is shown, but two or more computational errors are made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] The trial-and-error method is used to find the correct solution, but only two trials and appropriate checks are shown.
or [2] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.
or [2] An incorrect system of equations of equal difficulty is solved appropriately for both the number of nickels and dimes.
or [2] A correct equation is solved for x, but no further correct work is shown.
[1] Appropriate work is shown, but one conceptual error and one computational error are made.
or [1] A correct equation is written, but no further correct work is shown.
or [1] 17 nickels and 15 dimes, but no work or only one trial with an appropriate check is shown.
[0] 17 nickels or 15 dimes, but no work or only one trial with an appropriate check is shown.
or [0] 17 and 15, but no work is shown, and the answers are not labeled or are labeled incorrectly.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[38]

[4] 79.4, and appropriate work is shown, such as $\tan 52 = \frac{x}{62}$.
[3] Appropriate work is shown, but one computational or rounding error is made.
or [3] An incorrectly labeled diagram is drawn, but the appropriate trigonometric function is used, and an appropriate answer is found.
[2] Appropriate work is shown, but two or more computational or rounding errors are made.
or [2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect trigonometric function or ratio.
[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
or [1] A correctly labeled diagram is drawn, but no further correct work is shown.
or [1] A correct equation is written, but no further correct work is shown.
or [1] An incorrectly labeled diagram is drawn, but an appropriate equation is written, but no further correct work is shown.
or [1] 79.4, 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.

[39]