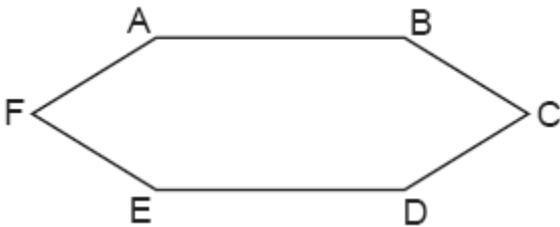


1. 060801a, P.I. A.N.5  
Segment  $RS$  is parallel to segment  $TU$ . If the slope of  $\overline{RS} = \frac{5}{8}$  and the slope of  $\overline{TU} = \frac{x}{24}$ , the value of  $x$  is  
[A] 20 [B] 5 [C] 10 [D] 15

2. 060802a  
Which type of figure is shown in the accompanying diagram?



- [A] octagon [B] pentagon  
[C] hexagon [D] quadrilateral
3. 060803a, P.I. A.RP.11  
At an all-county music competition, 150 students participated. If 90 students sang in the chorus and 90 played in the band, how many students *both* sang in the chorus and played in the band?  
[A] 30 [B] 240 [C] 60 [D] 0
4. 060804a, P.I. A.A.25  
What is the value of  $w$  in the equation  $0.04w + 0.6 = 2.4$ ?  
[A] 0.45 [B] 0.045 [C] 4.5 [D] 45
5. 060805a, P.I. A.A.13  
What is the sum of  $x^2 - 3x + 7$  and  $3x^2 + 5x - 9$ ?  
[A]  $4x^2 + 2x - 2$  [B]  $4x^2 - 8x + 2$   
[C]  $4x^2 - 2x - 2$  [D]  $4x^2 + 2x + 16$

6. 060806a, P.I. A.A.1  
If  $2n + 1$  represents an odd integer, the next larger odd integer is represented by  
[A]  $2n - 1$  [B]  $2n + 2$   
[C]  $2n + 3$  [D]  $2n$

7. 060807a, P.I. A.N.6  
What is the value of the expression  $2x^3y$  when  $x = -2$  and  $y = 3$ ?  
[A] -48 [B] -192 [C] 48 [D] -108

8. 060808a  
Expressed in scientific notation, the number 4,600,000,000 is  
[A]  $4.6 \times 10^{-9}$  [B]  $4.6 \times 10^9$   
[C]  $0.46 \times 10^{10}$  [D]  $4.6 \times 10^{-8}$

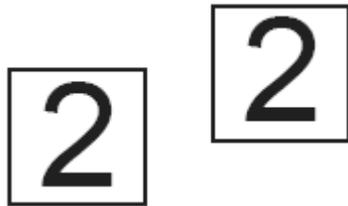
9. 060809a, P.I. A.N.7  
At a department store, there are six ways to enter the building, six ways to get from the first floor to the second floor, and four ways to get from the second floor to the third floor. In how many different ways could someone enter the building and go to the third floor?  
[A] 120 [B] 16 [C] 24 [D] 144

10. 060810a, P.I. A.A.22  
What is the value of  $x$  in the equation  $5 - 3x = -7$ ?  
[A] 4 [B]  $-\frac{2}{3}$  [C] -4 [D]  $\frac{2}{3}$

11. 060811a, P.I. A.N.2  
Which expression is equivalent to  $7\sqrt{90}$ ?

[A]  $\sqrt{630}$                       [B]  $21\sqrt{10}$   
[C]  $70\sqrt{9}$                       [D]  $16\sqrt{10}$

12. 060812a, P.I. G.G.56  
Which transformation is illustrated by the accompanying diagram?



[A] dilation                      [B] reflection  
[C] translation                      [D] rotation

13. 060813a, P.I. A.A.22  
If  $3(x+2) - 2(x+1) = 8$ , the value of  $x$  is

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

14. 060814a, P.I. A.N.6  
An expression equivalent to  $3!$  is

[A]  $3 \cdot 3 \cdot 3$                       [B]  $3 \cdot 3$                       [C]  $-3$                       [D]  $3 \cdot 2 \cdot 1$

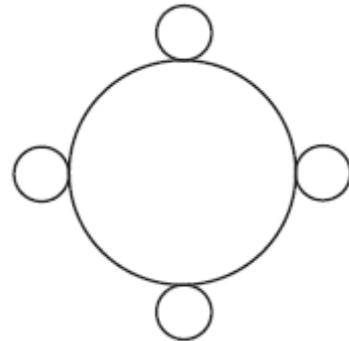
15. 060815a, P.I. A.N.1  
The reciprocal of 5 is

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

16. 060816a, P.I. G.G.26  
What is the converse of the statement "If  $x$  is an even integer, then  $(x+1)$  is an odd integer"?

[A] If  $(x+1)$  is not an odd integer, then  $x$  is not an even integer.  
[B]  $x$  is an even integer if and only if  $(x+1)$  is an odd integer.  
[C]  $x$  is not an even integer if and only if  $(x+1)$  is not an odd integer.  
[D] If  $(x+1)$  is an odd integer, then  $x$  is an even integer.

17. 060817a  
How many lines of symmetry does the accompanying figure have?



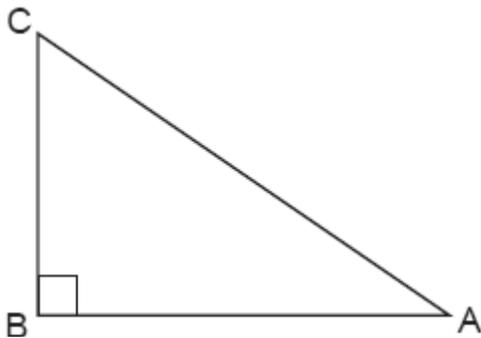
[A] an infinite number                      [B] 2  
[C] 4                      [D] 8

18. 060818a, P.I. A.G.1  
The dimensions of a rectangle are 4 and 16. What is the smallest integral value that could be the side of a square that has an area larger than that of the rectangle?

[A] 9                      [B] 81                      [C] 8                      [D] 64

19. 060819a  
Angle  $A$  and angle  $B$  are complementary angles. If  $m\angle A = x$ , which expression represents the number of degrees in angle  $B$ ?
- [A]  $x - 180$                       [B]  $x - 90$   
[C]  $180 - x$                       [D]  $90 - x$

20. 060820a, P.I. A.A.44  
Cassandra is calculating the measure of angle  $A$  in right triangle  $ABC$ , as shown in the accompanying diagram. She knows the lengths of  $\overline{AB}$  and  $\overline{BC}$ .



- If she finds the measure of angle  $A$  by solving only one equation, which concept will be used in her calculations?
- [A]  $\cos A$             [B]  $\tan A$   
[C]  $\sin A$             [D] Pythagorean theorem

21. 060821a, P.I. A.S.23  
The probability that Jinelle's bus is on time is  $\frac{2}{3}$ , and the probability that Mr. Corney is driving the bus is  $\frac{4}{5}$ . What is the probability that on any given day Jinelle's bus is on time and Mr. Corney is the driver?
- [A]  $\frac{8}{15}$             [B]  $\frac{10}{12}$             [C]  $\frac{6}{8}$             [D]  $\frac{2}{15}$

22. 060822a, P.I. G.G.66  
What is the midpoint of the line segment that joins points  $(4, -2)$  and  $(-2, 5)$ ?
- [A]  $(1, \frac{3}{2})$                       [B]  $(1, \frac{7}{2})$   
[C]  $(2, \frac{3}{2})$                       [D]  $(\frac{3}{2}, 3)$

23. 060823a, P.I. G.G.26  
A conditional statement is always logically equivalent to its
- [A] contrapositive            [B] converse  
[C] inverse                      [D] conjunction

24. 060824a, P.I. A.A.10  
If  $x + y = -10$  and  $x - y = 2$ , what is the value of  $x$ ?
- [A] 4            [B] -4            [C] 6            [D] -6

25. 060825a, P.I. G.G.54  
Point  $(-2, 3)$  is reflected in the  $x$ -axis. In which quadrant does its image lie?
- [A] IV            [B] III            [C] II            [D] I

26. 060826a, P.I. A2.A.9  
The expression  $(3c)^{-2}$  is equivalent to
- [A]  $\frac{3}{c^2}$             [B]  $-6c^2$             [C]  $\frac{1}{3c^2}$             [D]  $\frac{1}{9c^2}$

27. 060827a, P.I. A.N.1  
Which property is illustrated by the equation  $6 + (4 + x) = 6 + (x + 4)$ ?
- [A] commutative property of addition  
[B] associative property of multiplication  
[C] associative property of addition  
[D] distributive property

28. 060828a, P.I. A.N.1  
Under which operation is the set  $\{-1, 0, 1\}$  closed?
- [A] division                      [B] multiplication  
[C] subtraction                [D] addition

29. 060829a, P.I. A2.S.3  
The accompanying table represents the number of cell phone minutes used for one week by 23 users.

Number of Minutes	Number of Users
71–80	10
61–70	7
51–60	2
41–50	3
31–40	1

Which interval contains the median?

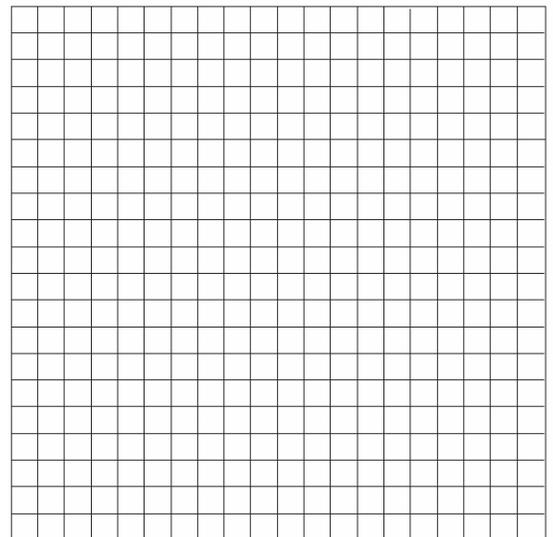
- [A] 51-60                      [B] 41-50  
[C] 61-70                      [D] 71-80
30. 060830a, P.I. A.G.2  
If the length of a side of a cube is  $7x$ , which expression represents the cube's volume?
- [A]  $343x^3$                       [B]  $343x$   
[C]  $7x^3$                         [D]  $49x^3$

31. 060831a, P.I. A.S.19  
Samuel is buying a new car. He wants either a convertible or a hatchback. Both types of cars are available in red, white, or blue and with automatic or standard transmission. Draw a tree diagram or list a sample space of all possible choices of cars that are available.

32. 060832a, P.I. A.A.45  
An 18-foot ladder leans against the wall of a building. The base of the ladder is 9 feet from the building on level ground. How many feet up the wall, to the *nearest tenth of a foot*, is the top of the ladder?

33. 060833a, P.I. A.M.1  
Kimberly rides her bicycle from her home to school at an average rate of 12 miles per hour. If it takes her 20 minutes to get to school, how many miles is her home from her school?

34. 060834a  
On the accompanying grid, draw the graph of the line whose slope is  $\frac{2}{3}$  and whose y-intercept is -2.



35. 060835a  
Write the following numbers in order from smallest value to largest value:

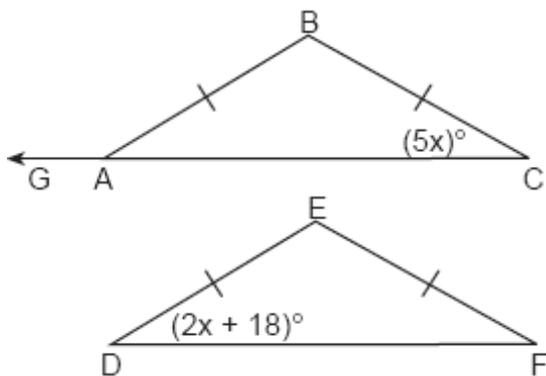
$$\sqrt{3}, 1\frac{2}{3}, \frac{3}{2}, 1.75, 1$$

Justify your answer.

36. 060836a, P.I. A.N.5  
Max is paid a salary of \$225 a week plus 2.5% commission on his total sales. Write an equation for  $P$ , Max's pay for one week, in terms of  $T$ , his weekly total sales. Use this equation to determine his total pay for a week in which his total sales are \$4,650.

37. 060837a, P.I. A.A.16  
Express in simplest form:  $\frac{x^2 - 5x - 24}{x^2 - 8x}$

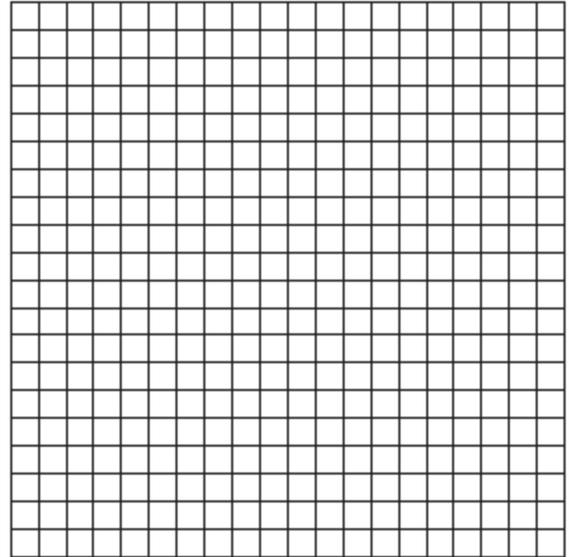
38. 060838a, P.I. G.G.31  
In the accompanying diagram, isosceles  $\triangle ABC \cong$  isosceles  $\triangle DEF$ ,  $m\angle C = 5x$ , and  $m\angle D = 2x + 18$ . Find  $m\angle B$  and  $m\angle BAG$ .



39. 060839a, P.I. A.G.9  
Solve the following system of equations algebraically or graphically for  $x$  and  $y$ :

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

$$y = x - 1$$



- [1] D
- [2] C
- [3] A
- [4] D
- [5] A
- [6] C
- [7] A
- [8] B
- [9] D
- [10] A
- [11] B
- [12] C
- [13] D
- [14] D
- [15] A
- [16] D
- [17] C
- [18] A
- [19] D
- [20] B
- [21] A
- [22] A
- [23] A
- [24] B
- [25] B
- [26] D
- [27] A
- [28] B

- [29] C
- [30] A

[2] A complete and correct tree diagram or sample space is shown.  
[1] A tree diagram or sample space is shown, but one error is made.  
[0] A tree diagram or sample space is shown, but two or more errors are made.  
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- [31] \_\_\_\_\_  
[2] 15.6, and appropriate work is shown.  
[1] Appropriate work is shown, but one computational or rounding error is made.  
or [1] Appropriate work is shown, but one conceptual error is made.  
or [1] 15.6, 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] 4, and appropriate work is shown, such as using the formula  $rt = d$  or trial and error with at least three trials and appropriate checks.  
[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] 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] 4, but no work or fewer than three trials with appropriate checks are 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] A correct graph is drawn that passes through the points (0,-2) and (3,0).  
[1] Appropriate work is shown, but one graphing error is made.  
or [1] Appropriate work is shown, but one conceptual error is made.  
or [1] At least two points that are on the line are plotted, but no graph is drawn.  
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- [34] 

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- [2]  $1, \frac{3}{2}, 1\frac{2}{3}, \sqrt{3}, 1.75$ , and an appropriate justification is given, such as work that shows all the given numbers converted to decimals.  
[1] Appropriate work is shown, but one computational error is made.  
or [1] Appropriate work is shown, but one conceptual error is made, such as listing the numbers from largest to smallest.  
or [1] An equivalent decimal value is found for all the numbers, but the numbers are not listed or are listed incorrectly.  
or [1]  $1, \frac{3}{2}, 1\frac{2}{3}, \sqrt{3}, 1.75$ , 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.
- [35] 

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- [3] A correct equation is written, such as  $P = 225 + 0.025T$ , and 341.25, and appropriate work is shown.  
[2] A correct equation is written and appropriate work is shown, but one computational error is made.  
or [2] Appropriate work is shown to find the correct total pay, but no equation is written.  
[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, such as using  $P = 225 + 0.25T$ .  
or [1] A correct equation is written, but no further correct work is shown.  
or [1] 341.25, but no work is shown and no equation is written.  
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- [36] 

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- [3]  $\frac{x+3}{x}$  or  $1 + \frac{3}{x}$ , and appropriate work is shown.  
[2] Appropriate work is shown, but one computational or factoring error is made.  
[1] Appropriate work is shown, but two or more computational or factoring errors are made.  
or [1] Appropriate work is shown, but one conceptual error is made.  
or [1]  $\frac{x+3}{x}$  or  $1 + \frac{3}{x}$ , 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.
- [37] 

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- [4]  $m\angle B = 120$  and  $m\angle BAG = 150$ , and appropriate work is shown.
- [3] Appropriate work is shown, but one computational error is made.
- or [3] Appropriate work is shown, but only  $m\angle B$  or  $m\angle BAG$  is found.
- or [3] Appropriate work is shown, and the correct answers are found, but they are not labeled or are labeled incorrectly.
- [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] Appropriate work is shown to find  $x=6$ , but no further correct work is shown.
- [1]  $5x=2x+18$  is written, but no further correct work is shown.
- or [1]  $m\angle B = 120$  and  $m\angle BAG = 150$ , but no work is shown.
- [0]  $m\angle B = 120$  or  $m\angle BAG = 150$ , but 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 obviously incorrect procedure.
- 
- [38]

- [4] (1,0) and (4,3), and appropriate work is shown, such as an algebraic or a graphic solution.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- or [3] Appropriate algebraic work is shown, but only one solution is found or only the  $x$ -values or the  $y$ -values are found correctly.
- or [3] Both equations are graphed correctly showing two points of intersection, but the coordinates of the solutions are not written or only one is written.
- [2] Appropriate work is shown, but two or more computational or graphing errors are made.
- or [2] Appropriate work is shown, but one conceptual error is made, such as failing to extend the line or the parabola to intersect at a second point.
- or [2] The system of equations is written as  $x^2 - 5x + 4 = 0$ , but no further correct work is shown.
- or [2] The equation  $y = x^2 - 4x + 3$  is graphed correctly, but no further correct work is shown.
- or [2] (1,0) and (4,3), but a method other than an algebraic or graphic solution is used, such as trial and error with at least three trials and appropriate checks.
- [1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.
- or [1] The equation  $y = x - 1$  is graphed correctly, but no further correct work is shown.
- or [1] A correct substitution results in  $x - 1 = x^2 - 4x + 3$ , but no further correct work is shown.
- or [1] (1,0) and (4,3), but no algebraic or graphic work is shown or the trial-and-error method is used and fewer than three trials and appropriate checks are shown.
- 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.
- 
- [39] or [1] (1,0) and (4,3), but no work is shown.

[0] (1,0) or (4,3), but 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  
obviously incorrect procedure.

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