

Section 4
Mathematics Achievement

47 Questions

Time: 40 minutes

Each question is followed by four suggested answers. Read each question and then decide which one of the four suggested answers is best.

Find the row of spaces on your answer document that has the same number as the question. In this row, mark the space having the same letter as the answer you have chosen. You may write in your test booklet.

SAMPLE QUESTION:

Sample Answer

If $a = 3$, what is the value $a^2 + (3 \times 4) \div 6$?

(A) (B) (C) (D)

(A) 3.5

(B) 11

(C) 14.5

(D) 20

The correct answer is 11, so circle B is darkened.

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- Which of the following numbers is divisible by 6?
 - 356
 - 358
 - 360
 - 362
- If 40 percent of a number is 200, then 10 percent of the same number is
 - 10
 - 20
 - 50
 - 190
- If $\blacksquare x = x^3 + 2$, then $\blacksquare 2 =$
 - 5
 - 6
 - 8
 - 10
- The sum of three consecutive odd numbers is 171. What is the largest number?
 - 57
 - 58
 - 59
 - 61
- The average test score of three students in a class is 81 percentage points. If one student's score goes up by 2 percentage points, one student's score goes up by 4 percentage points, and the other student's score remains the same, what will the new average test score be?
 - 81 percentage points
 - 83 percentage points
 - 84 percentage points
 - 87 percentage points

- A squirrel ate an average of x acorns per day for x days. After those x days, the squirrel ate an average of y acorns per day for y days. What was the average number of acorns eaten by the squirrel per day during that entire time period?

- $\frac{x^2+y^2}{x+y}$
- $\frac{x+y}{2}$
- $\frac{x^2+y^2}{2}$
- $\frac{x+y}{xy}$

- In Figure 1, $EFGH$ is a square. What is the area of the UNSHADED region?

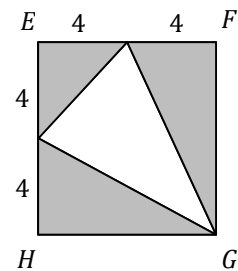


Figure 1

- 8
 - 16
 - 24
 - 28
- A safari company offers group tours that cost \$100 for two people and \$20 more for each additional person. If five people share the cost of the tour equally, how much does each person pay?
 - \$20.00
 - \$24.00
 - \$32.00
 - \$40.00

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9. If Figure 2 is a rectangle, then what is the value of x ?

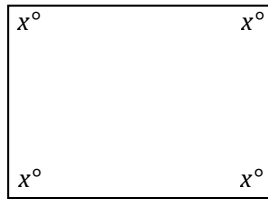


Figure 2

- (A) 45
- (B) 90
- (C) 180
- (D) 360

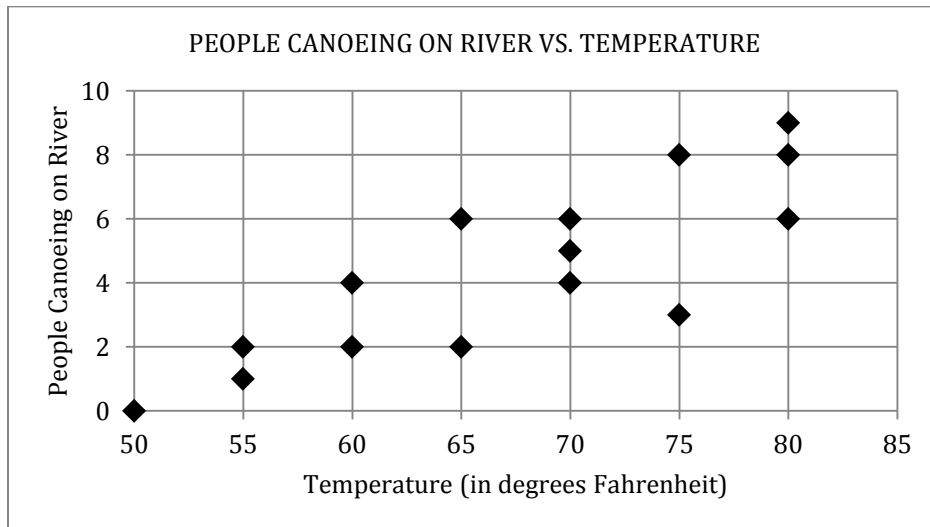
10. There were 17 sunny days this year, which was 18 fewer than last year. Two years ago, there were three times as many sunny days as there were this year. How many total sunny days were there in all three years?

- (A) 35
- (B) 51
- (C) 103
- (D) 104

11. What is the slope of the line $x = 4y - 24$?

- (A) 4
- (B) 1
- (C) $\frac{1}{4}$
- (D) -4

12. Lisa counted the number of people canoeing on a river depending on the day's temperature on 15 separate occasions. The scatter plot below represents the data she collected. According to this information, approximately what temperature would you expect it to be if 4 people are canoeing on the river?



- (A) 50-60°
- (B) 60-70°
- (C) 70-80°
- (D) 75-87°

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13. $498.57 =$

- (A) $498 + \frac{5}{1} + \frac{7}{10}$
 (B) $498 + \frac{5}{10} + \frac{7}{10}$
 (C) $498 + \frac{5}{10} + \frac{7}{100}$
 (D) $498 + \frac{5}{100} + \frac{7}{1000}$

14. If two times x is greater than 7, then which of the following numbers could NOT be a value of x ?

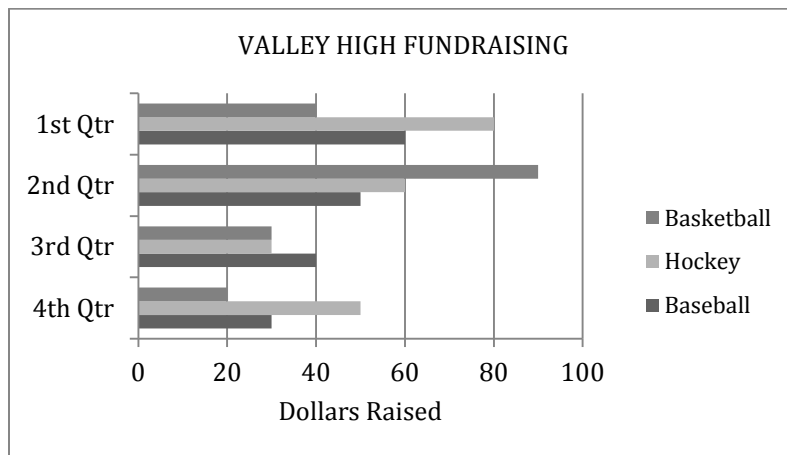
- (A) $3\frac{1}{2}$
 (B) $3\frac{3}{4}$
 (C) 4
 (D) $4\frac{1}{2}$

15. Lucy is ordering some books online.

There is a flat shipping fee for the first book she orders, and an additional charge for every extra book. This is represented by the formula $y = 0.75(x - 1) + 7$, where y is the total shipping cost and x is the total number of books ordered. What is the meaning of 0.75 in this formula?

- (A) For every dollar it costs to ship, there are 0.75 books being mailed.
 (B) For every book bought, the shipping cost is \$6.25.
 (C) For every extra book bought after the first, shipping costs an additional \$0.75 per book.
 (D) When 7 books are bought, the shipping cost is \$0.75.

16. The bar graph below shows the amount of money raised by three different sports teams during a fundraising event with four quarters.



Over all four quarters, the total funds raised by the basketball team were approximately what fraction of the total funds raised by the hockey team?

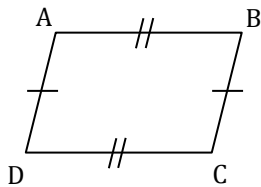
- (A) $\frac{3}{5}$
 (B) $\frac{4}{5}$
 (C) $\frac{9}{11}$
 (D) $\frac{10}{11}$

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17. Emily is eating her colored candies in the following pattern: one green, one blue, one red, one orange, one brown, one green, one blue, and so on. If this pattern continues, the 27th candy she eats will be what color?

(A) green
(B) red
(C) brown
(D) blue

18. What kind of quadrilateral is $ABCD$?



- (A) square
(B) rhombus
(C) parallelogram
(D) rectangle
19. What is the value of the expression $\frac{3}{4} + 0.21 + 1.17 + \frac{1}{10}$?

(A) 1.73
(B) 2.10
(C) 2.23
(D) $2\frac{1}{3}$

20. Keira has a set of paints with the following eight colors: red, orange, yellow, green, blue, purple, pink, and brown. If she randomly selects one color to paint the outline of a shape and then randomly selects one color to paint its interior, what is the probability that the shape has both an orange outline and an orange interior?

(A) $\frac{1}{64}$
(B) $\frac{1}{16}$
(C) $\frac{1}{8}$
(D) $\frac{3}{8}$

21. What is the slope of a line parallel to the line $\frac{1}{5}y - 3 = x$?

(A) -5
(B) $-\frac{1}{5}$
(C) $\frac{1}{5}$
(D) 5

22. Pete can finish 20 math problems in 15 minutes. Julia can finish 45 math problems in 30 minutes. If they both have 60 minutes to work on the same math problems, how many more problems will Julia finish?

(A) 5
(B) 10
(C) 15
(D) 25

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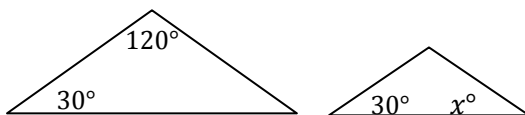
23. Kaitlin measured the weight of her pet hamsters on a weekly basis for four weeks. The table below shows the data she collected.

Hamster	Week 1 Weight (in ounces)	Week 2 Weight (in ounces)	Week 3 Weight (in ounces)	Week 4 Weight (in ounces)
Lulu	2	8	9	9
Buttercup	6	7	8	9
Cream Puff	10	12	15	21
Pepper	4	7	11	13

Which of Kaitlin's hamsters gained the most weight over the first two weeks?

- (A) Lulu
 (B) Buttercup
 (C) Cream Puff
 (D) Pepper

24. The figure below shows two similar triangles.



What is the value of x ?

- (A) 30°
 (B) 60°
 (C) 120°
 (D) 180°

25. The volume of a cube is 27 cm^3 . What is the surface area of the cube?

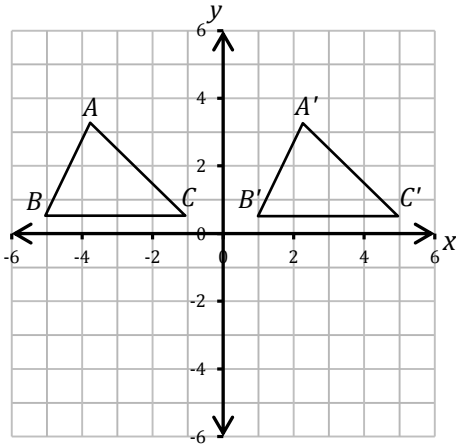
- (A) 9 cm^2
 (B) 27 cm^2
 (C) 36 cm^2
 (D) 54 cm^2

26. Which of the following expressions is NOT equal to 26?

- (A) $2 \times \frac{20}{2} + 6$
 (B) $\left(2 \times \frac{20}{2}\right) + 6$
 (C) $2 \times \left(\frac{20}{2} + 6\right)$
 (D) $2 \times \left(\frac{20+6}{2}\right)$

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27. How has triangle ABC been transformed to produce triangle $A'B'C'$?



- (A) Triangle ABC was reflected across the x -axis.
- (B) Triangle ABC was rotated 90°
- (C) Triangle ABC was translated horizontally 2 units to the right.
- (D) Triangle ABC was translated horizontally 6 units to the right.

28. Of the 25% of the customers at an ice cream shop who order soft-serve ice cream, $\frac{2}{3}$ order sprinkles as well. What fraction of the shop's customers order soft-serve ice cream with sprinkles?

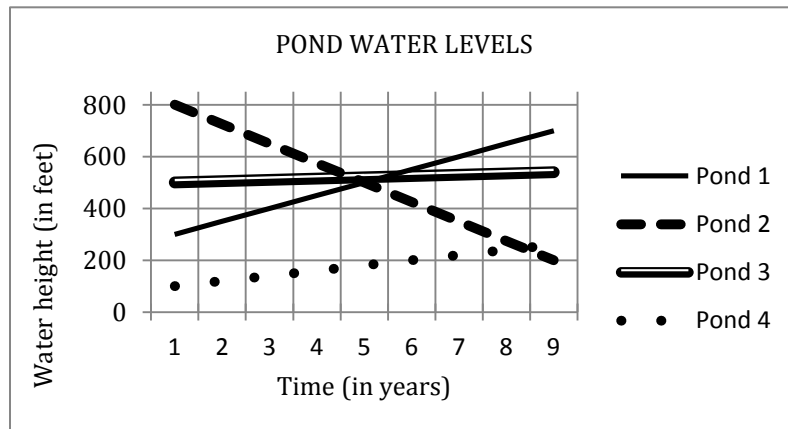
- (A) $\frac{4}{25}$
- (B) $\frac{1}{6}$
- (C) $\frac{1}{5}$
- (D) $\frac{1}{3}$

29. Which expression is equivalent to the expression shown?

$$\sqrt{9}(\sqrt{144} + 6x) \div 3$$

- (A) $\sqrt{16}(6x + 2)$
- (B) $\sqrt{153} + 6x$
- (C) $6(2 + x)$
- (D) $18(1 + 3x)$

30. The graph below shows the water level in four different ponds over a period of 9 years.



Which pond's water level changed the most during the 9-year period?

- (A) Pond 1
- (B) Pond 2
- (C) Pond 3
- (D) Pond 4

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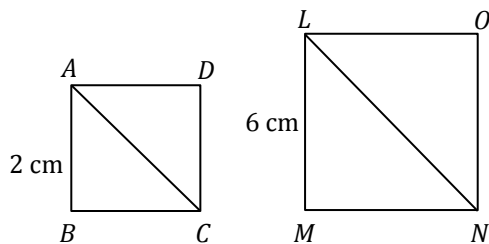
31. A school volleyball team is selling cupcakes to raise money. Their profits are their sale revenues minus their costs. Each box of cupcake mix can make 25 cupcakes and costs \$5.00 for the team to purchase. A tub of frosting can frost 50 cupcakes and costs \$2.00. If the team sells each cupcake for \$1.00, what is the fewest number of cupcakes they must sell to make \$20 in profits?

- (A) 20
- (B) 27
- (C) 32
- (D) 35

32. $12 \times \left(\frac{3}{12} - \frac{1}{4}\right) =$

- (A) 0
- (B) $\frac{1}{12}$
- (C) 6
- (D) 24

33. Triangles ABC and LMN are similar.



What is the ratio of the perimeter of square $ABCD$ to the perimeter of square $LMNO$?

- (A) 1 to 3
- (B) 1 to 4
- (C) 1 to 9
- (D) 1 to 18

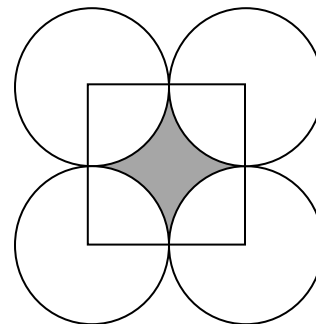
34. The figure below shows the first five elements of a dot pattern.



What is the sixth element of this pattern?

- (A)
- (B)
- (C)
- (D)

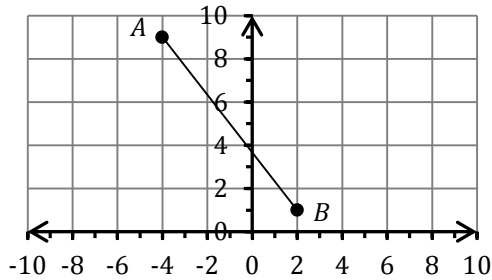
35. In the figure below, the centers of four identical circles form the corners of a square. The radius of each circle is 2 cm. What is the area of the shaded region?
(area of a circle = πr^2)



- (A) $4 - 4\pi \text{ cm}^2$
- (B) 4 cm^2
- (C) $16 - 4\pi \text{ cm}^2$
- (D) $16\pi - 4 \text{ cm}^2$

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36. Corwin is plotting a right triangle on the coordinate system shown below.



Two of the triangle's vertices are designated as points *A* and *B*. Which of the following coordinates could be the third vertex of the triangle?

- (A) $(-6, 1)$
 - (B) $(-4, 1)$
 - (C) $(1, -4)$
 - (D) $(6, 4)$
37. Hayley estimated the answer to the expression $(\sqrt{28} \times 298) \div 2$. Which of the following values is the closest estimate?
- (A) 1500
 - (B) 900
 - (C) 750
 - (D) 650

38. The expression $\frac{x}{w} \left(\frac{wx}{y} - \frac{w}{x} \right)$ is equivalent to which expression?
- (A) $\frac{x^2w}{y}$
 - (B) $\frac{x^2-y}{y}$
 - (C) $\frac{x+y^2}{wx}$
 - (D) $\frac{x^2}{wy-wx}$

39. Three ☺ are equal to six ♣, and one ♣ is equal to four ☼. How many ☺ are equal to twelve ☼?

- (A) 1
- (B) 1.5
- (C) 3
- (D) 4.5

40. Rachel drew a map of her neighborhood, where 3 grid blocks represent 10 meters. If her house is 7.5 grid blocks away from her neighbor's house, how far apart are they in meters?

- (A) 7.5
- (B) 10
- (C) 25
- (D) 75

41. Which of the following is not a prime factor of 60?

- (A) 2
- (B) 3
- (C) 5
- (D) 6

42. If the area of a circle is πr^2 and the radius of a circle is half its diameter, what is the area of a circle with a diameter of 12?

- (A) 12π
- (B) 24π
- (C) 36π
- (D) 144π

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43. Victoria walks her dog at an average rate of 2 blocks per 5 minutes. If she walked her dog for a total of 5 hours over the course of the week, how many blocks did she walk?

- (A) 50
- (B) 60
- (C) 100
- (D) 120

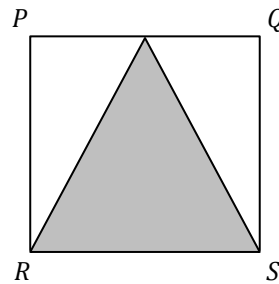
44. Rory has an average score of 89 on four math tests. Her highest test score was a 96, and the range of her scores was seventeen points. What was her lowest math score?

- (A) 70
- (B) 79
- (C) 89
- (D) 90

45. If M is an odd number, which of the following must also be odd?

- (A) $2M$
- (B) M^2
- (C) $M - 3$
- (D) $M - M$

46. Figure $PQRS$ is a square with side lengths of 6 cm. What is the area of the shaded region?



- (A) 6
- (B) 18
- (C) 36
- (D) 81

47. The local blackbird population increased by 25% over the last five years. If x represents the size of the population five years ago, which expression represents the size of the current population?

- (A) $0.125x$
- (B) $12.5x$
- (C) $125/x$
- (D) $1.25x$

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