

Section 4
Mathematics Achievement

Time—40 Minutes

47 Questions

Each question has four answer choices. Read each question and choose the best answer. You may write on your test.

STOP. DO NOT GO ON UNTIL TOLD TO DO SO.

STOP



1. A bag contains only blue and red marbles. If there are three blue marbles for every red marble, what fraction of all the marbles is red?

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

Questions 2 and 3 refer to the graph.

The graph shows the distribution of shirt sizes sold by Ace T-Shirt Company in September.

SEPTEMBER SALES FOR ACE T-SHIRT CO.



Total Sales: 1,200 shirts

2. Approximately how many medium-sized shirts were sold?
- (A) 300
(B) 400
(C) 500
(D) 600
3. If each shirt sells for \$5.95, approximately how much was spent on small-sized shirts?
- (A) \$300
(B) \$900
(C) \$1,800
(D) \$3,600
4. Five percent of the guests at a Halloween party were dressed as witches. If there were 8 witches at the party, how many guests were at the party?
- (A) 40
(B) 80
(C) 160
(D) 200

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A

Questions 5 and 6 refer to the following definition.

For all real numbers a and b ,

$$a @ b = (a \times b) - (a + b).$$

5. $9 @ 8 =$

- (A) 55
- (B) 71
- (C) 72
- (D) 73

6. If $10 @ N = -1$, then what is the value of N ?

- (A) 0
- (B) 1
- (C) 9
- (D) 11

7. The perimeter of a rectangle is 32. If its length is three times as long as its width, what is its width?

- (A) 4
- (B) 6
- (C) 8
- (D) 12

8. Aurica averaged 168 in the first three games she bowled. What must she score in her fourth game in order to raise her average 5 points?

- (A) 158
- (B) 163
- (C) 178
- (D) 188

9. Which of the following equations could NEVER be true?

- (A) $N \times 0 = N$
- (B) $1 \times N = N$
- (C) $N \times N = N$
- (D) $N - 1 = N$

10. If X is the set of numbers greater than 6, and Y is the set of numbers less than 11, how many whole numbers exist that are in both sets?

- (A) 4
- (B) 5
- (C) 6
- (D) Infinitely many

11. Warren has 30% more money than Eduardo has. If Eduardo has \$65, how much money does Warren have?

- (A) \$45.50
- (B) \$50.00
- (C) \$80.00
- (D) \$84.50

12. If $12 + P = 20 - 2 \times 3$, then what is the value of P ?

- (A) 2
- (B) 14
- (C) 36
- (D) 42

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A

13. If m is greater than n , and n is greater than 4, which of the following is LEAST?
- (A) $\frac{1}{4m}$
(B) $\frac{1}{4n}$
(C) $\frac{1}{4+m}$
(D) $\frac{1}{4+n}$
14. At a party, $\frac{1}{3}$ of the guests drank only water, and $\frac{2}{5}$ of the guests drank only juice. If the remaining 16 guests had nothing to drink, then how many guests were at the party?
- (A) 30
(B) 45
(C) 50
(D) 60
15. What are all the values of x for which $(x-2)(x+5) = 0$?
- (A) -5
(B) -2
(C) 2 and -5
(D) -2 and -5
16. What is the value of $\frac{1}{9} + \frac{7}{12} + \frac{5}{6}$?
- (A) $\frac{9}{13}$
(B) $1\frac{19}{36}$
(C) $1\frac{2}{3}$
(D) 2
17. Which of the following is closest to 15%?
- (A) $\frac{1}{7}$
(B) $\frac{1}{5}$
(C) $\frac{1}{4}$
(D) $\frac{1}{3}$
18. When the sum of a set of numbers is divided by the average of these numbers, the result is j . What does j represent?
- (A) Half of the sum of the numbers in the set
(B) The average of the numbers in the set
(C) Half of the average of the numbers in the set
(D) The quantity of numbers in the set
19. If $a = 3$ and $b = 4$, what is the value of $a^2 + 2ab + b^2$?
- (A) 14
(B) 24
(C) 49
(D) 144
20. How many distinct prime factors are there of 726?
- (A) 2
(B) 3
(C) 4
(D) 5

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A

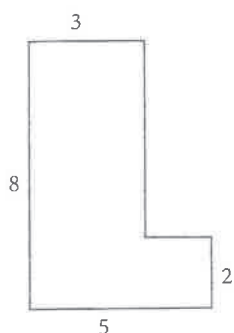
21. On Monday, the temperatures of four different cities were 55°F , -18°F , 25°F , and -15°F . What was the average (arithmetic mean) temperature on Monday for these four cities?
(A) 11.75°F
(B) 12°F
(C) 20°F
(D) 47°F
22. What is $\frac{1}{4}$ of 0.72?
(A) 0.018
(B) 0.18
(C) 1.8
(D) 18
23. In a certain garage, 3 out of every 10 vehicles are trucks. If there are 180 vehicles at the garage, how many of them are trucks?
(A) 27
(B) 45
(C) 54
(D) 60
24. Andres is x years old, and Percy is three times as old as Andres. What was the sum of their ages, in years, five years ago?
(A) $x - 5$
(B) $2x + 2$
(C) $3x - 10$
(D) $4x - 10$
25. If the perimeter of a regular hexagon is 42, what is the sum of the lengths of two sides?
(A) 6
(B) 7
(C) 12
(D) 14
26. Which of the following is a possible value of z if $2(z - 3) > 6$ and $z + 4 < 15$?
(A) 3
(B) 6
(C) 7
(D) 11
27. Daniela has y cards from a trading card game. She gives 5 cards to each of three different friends and, in return, receives 2 cards from each friend. How many cards does Daniela have after the exchange?
(A) $y - 9$
(B) $y - 5$
(C) $y + 3$
(D) $y + 5$
28. If the average of 6 numbers is 9, what is the sum of those numbers?
(A) 15
(B) 30
(C) 54
(D) 96

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A

29. Four side measures of the complex figure are shown in the diagram.



What is the total area of the figure?

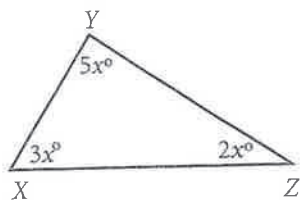
- (A) 10
(B) 24
(C) 28
(D) 45
30. How many distinct prime factors are there of 48?
- (A) 1
(B) 2
(C) 3
(D) 4
31. Four angle measures are shown in the diagram.
-
- What is the value of a ?
- (A) 20
(B) 40
(C) 60
(D) 80
32. If $2x + 4 = 26$, then what is the value of $x + 4$?
- (A) 9
(B) 11
(C) 13
(D) 15
33. If $x + y$ equals an odd number and $x + z$ equals an even number, which of the following statements could NOT be true?
- (A) x is even and y is odd.
(B) y is even and z is odd.
(C) x and z are even and y is odd.
(D) x and y are even and z is odd.
34. If $\frac{1}{2} > x > 0$ and $\frac{1}{3} > x > \frac{1}{10}$, which of the following is a possible value for x ?
- (A) $\frac{2}{3}$
(B) 0.47
(C) $\frac{1}{5}$
(D) $\frac{1}{20}$
35. Makayla began reading from the beginning of page 42 of a book and stopped at the end of page 83. How many pages did she read?
- (A) 40
(B) 41
(C) 42
(D) 43

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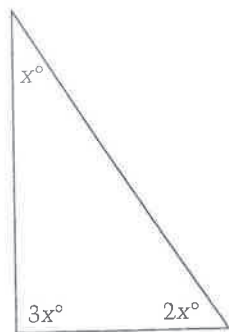
A

36. Three angle measures of a triangle are shown in the diagram.



What is the degree measure of angle YXZ ?

- (A) 18
(B) 36
(C) 54
(D) 72
37. What is the difference between 30% of 400 and 15% of 400?
- (A) 30
(B) 60
(C) 150
(D) 200
38. Three angle measures of a triangle are shown in the diagram.



What is the value of x ?

- (A) 20
(B) 30
(C) 45
(D) 90

Questions 39 and 40 refer to the following definition.

For all real numbers q and r , let $q // r = (qr) - (q - r)$.

39. What is the value of $8 // 2$?
- (A) 6
(B) 8
(C) 10
(D) 16
40. If $P // 3 = 11$, then what is the value of P ?
- (A) 3
(B) 4
(C) 6
(D) 7

41. Three points are labeled on the line segment below.



If $AB = 8$ and $AC = 14$, how far is the midpoint of AB from the midpoint of BC ?

- (A) 3
(B) 4
(C) 7
(D) 8
42. What is the slope of the line that contains points $(3, -5)$ and $(-1, 7)$?
- (A) -3
(B) $-\frac{1}{3}$
(C) $-\frac{1}{4}$
(D) $\frac{1}{3}$

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A

43. If one-fourth of a number is 3, what is one-third of the same number?
- (A) 3
(B) 4
(C) 6
(D) 12
44. Isaiah's family is painting several rooms. If 2 gallons of paint can cover 725 square feet of surface, how many gallons will they need to cover 2,175 square feet of surface?
- (A) 3
(B) 4
(C) 6
(D) 8
45. If $r = 8$, then what is the value of $(r + 4)^2$?
- (A) 24
(B) 64
(C) 80
(D) 144
46. At which of the following times is the smaller angle formed by the minute hand and the hour hand of a clock less than 90 degrees?
- (A) 1:30
(B) 3:00
(C) 4:30
(D) 6:00
47. Four equations are shown.
- $$2,955 \times A = 35,460$$
- $$11,820 \times B = 35,460$$
- $$3,940 \times C = 35,460$$
- $$7,092 \times D = 35,460$$
- If each of the equations is correctly solved, which of the following has the greatest value?
- (A) A
(B) B
(C) C
(D) D

STOP. IF THERE IS TIME, YOU MAY CHECK YOUR WORK IN THIS SECTION ONLY.

STOP

Section 4**Mathematics Achievement**

Time—40 Minutes

47 Questions

Each question has four answer choices. Read each question and choose the best answer. You may write on your test.

STOP. DO NOT GO ON UNTIL TOLD TO DO SO.**STOP**



B

1. How many seconds are there in $\frac{1}{20}$ of a minute?

(A) 2
(B) 3
(C) 20
(D) 30

2. What is the greatest number of squares, each measuring 2 centimeters by 2 centimeters, that can be cut from a rectangle with a length of 8 centimeters and a width of 6 centimeters?

(A) 6
(B) 8
(C) 12
(D) 48

3. A movie collection was divided among six people so that each received the same number of movies. Which of the following could be the number of movies in the collection?

(A) 10
(B) 15
(C) 21
(D) 24

4. If $\frac{1}{2} + \frac{1}{3} = \frac{M}{12}$, then what is the value of M ?

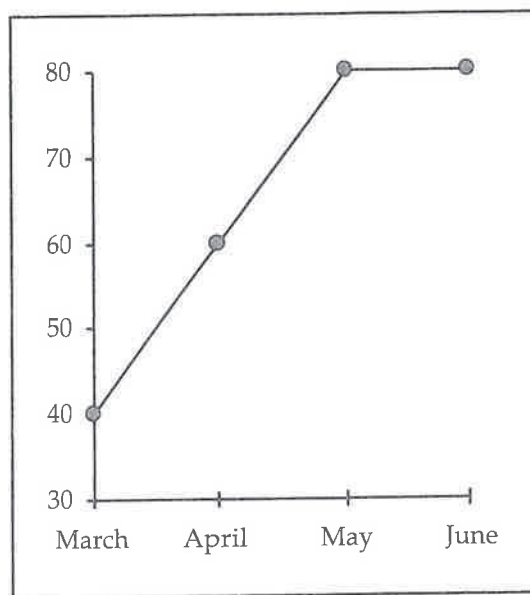
(A) 8
(B) 9
(C) 10
(D) 11

5. If $N_2 = N \times 10$, then what is the value of $30_2 + 2_2$?

(A) 32
(B) 302
(C) 320
(D) 3,200

6. The graph shows the number of students who took the swimming class each month from March to June.

NUMBER OF STUDENTS TAKING
SWIMMING CLASS



According to the graph, what is the average number of students taking the swimming class during the four months?

(A) 55
(B) 65
(C) 70
(D) 80

7. What is twenty percent of 30?

(A) 6
(B) 8
(C) 10
(D) 12.5

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B

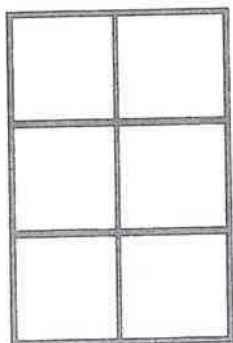
8. If $x = 4y + 3$, then what does $x - 5$ equal?

(A) $4y - 8$
 (B) $4y - 2$
 (C) $4y + 5$
 (D) $5y - 8$

9. If n is an odd number, which of the following MUST be even?

(A) $-2n - 1$
 (B) $2n + 1$
 (C) $2n - 1$
 (D) $4n$

10. The diagram is a complex figure composed of six squares.



How many rectangles are there in the figure?

(A) 12
 (B) 15
 (C) 18
 (D) 20

11. If 45 is divided by the product of 3 and 5, what is the result?

(A) 3
 (B) 5
 (C) 9
 (D) 15

12. If $a + b = 6$, then which expression is equal to b ?

(A) $b = a - 6$
 (B) $b = 6 - a$
 (C) $b = 6a$
 (D) $b = \frac{6}{a}$

13. In a basketball game, Team A scored 39 points, and Team B scored more points than Team A. If Team B has 5 players, the average score of the players on Team B must have been at least how many points?

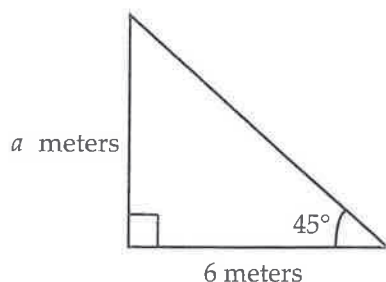
(A) 5
 (B) 6
 (C) 8
 (D) 12

14. What is the value of one and one-third minus five-sixths?

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

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15. The measures of two sides and one angle of a triangle are shown in the diagram.



What is the value of a ?

- (A) 4
(B) 6
(C) 8
(D) 9
16. What is the value of $\frac{64}{2 \times 4}$?
- (A) 8
(B) 24
(C) 42
(D) 128
17. What is the area of a triangle with a base of 4 inches and a height of 6 inches?
- (A) 10
(B) 12
(C) 20
(D) 24
18. In a certain class, there are twice as many bus riders as walkers. If the total number of students in the class is 36, how many bus riders are there?
- (A) 9
(B) 12
(C) 18
(D) 24
19. A museum records 16 visitors to an exhibit on Monday, 21 on Tuesday, 20 on Wednesday, 17 on Thursday, 19 on Friday, 21 on Saturday, and 17 on Sunday. What is the median number of visitors for the week?
- (A) 18
(B) 18.71
(C) 19
(D) 19.5
20. If $\frac{1}{5}$ of a number is less than 20, what is the number?
- (A) Less than 4
(B) Greater than 4
(C) Less than 100
(D) Greater than 100
21. If $Q + 7 - 8 + 3 = 23$, what is the value of Q ?
- (A) 19
(B) 20
(C) 21
(D) 22
22. If $a + 2 > 5$ and $a - 4 < 1$, which of the following is a possible value for a ?
- (A) 2
(B) 3
(C) 4
(D) 5
23. The expression $2 \times 4 \times 7 \times 9$ is equal to the product of 18 and what number?
- (A) 8
(B) 14
(C) 28
(D) 36

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B

24. What is the value of $(65 \times 10^2) + (31 \times 10^3) + 12$?

- (A) 375.12
- (B) 3,751.20
- (C) 37,512
- (D) 375,120

25. If the product of integers a and b is 16, and a is greater than 4, then which of the following **MUST** be true?

- I. $b = 2$
- II. The sum of a and b is greater than zero
- III. a is greater than b

- (A) II only
- (B) III only
- (C) I and II only
- (D) II and III only

26. If $x = \sqrt{3}$, $y = 2$, and $z = \frac{1}{2}$, then what is the value of $x^2 - 5yz + y^2$?

- (A) 1
- (B) 2
- (C) 4
- (D) 8

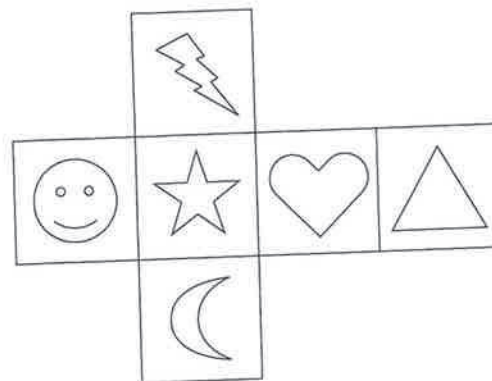
27. If 9 is x percent of 90, what is 50 percent of x ?

- (A) 5
- (B) 10
- (C) 15
- (D) 18

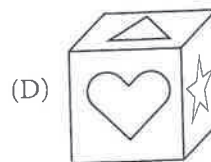
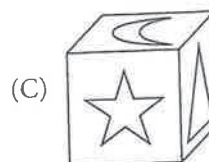
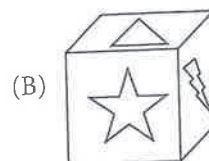
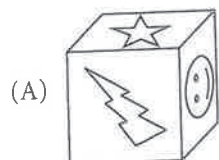
28. If 9 is added to the product of 12 and 4, what is the result?

- (A) 17
- (B) 25
- (C) 57
- (D) 84

29. A net is shown.



Which figure is a possible cube for the net?

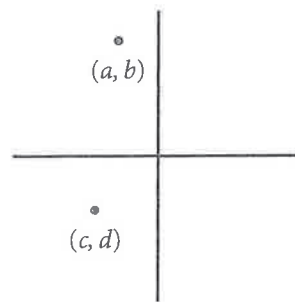


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30. If $\frac{700}{x} = 35$, then what is the value of x ?
- (A) 2
(B) 5
(C) 20
(D) 200
31. When an integer is multiplied by itself, it can end in all of the following EXCEPT what digit?
- (A) 1
(B) 3
(C) 5
(D) 6
32. Diya has six more dollars than her brother. How many dollars would she have to give him so that they would have an equal amount of money?
- (A) 6
(B) 4
(C) 3
(D) 2
33. If $\frac{28}{a} = \frac{48}{12}$, then what is the value of a ?
- (A) 7
(B) 8
(C) 9
(D) 10

34. The graph of points (a, b) and (c, d) is shown.



Which of the following statements MUST be true?

- (A) $bd > ac$
(B) $c > ad$
(C) $b > acd$
(D) $bc > ad$
35. What is the slope of a line that goes through the points $(-42, 10)$ and $(6, -8)$?
- (A) $-\frac{8}{3}$
(B) $-\frac{3}{8}$
(C) $\frac{3}{8}$
(D) $\frac{8}{3}$
36. A six-story apartment building has x apartments on each of its lower 3 floors and y apartments on each of its upper 3 floors. If 3 people live in each apartment, how many people live in the building?
- (A) $3x + 3y$
(B) $3x + 3y + 3$
(C) $9x + 9y$
(D) $3x + 3y + 18$

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B

37. If Selena is in school for 6 hours per day, 5 days per week, how many seconds does Selena spend in school in one week?
- (A) 18,000
(B) 108,000
(C) 180,000
(D) 1,108,000
38. A grocer buys oranges at a price of four for \$1 and then sells them in her store for 40 cents each. How many oranges must she sell to earn a profit of \$3?
- (A) 2
(B) 10
(C) 15
(D) 20
39. The average of a set of six numbers is 6. If 3 is subtracted from each of four of the numbers, what is the new average?
- (A) 1.5
(B) 2
(C) 3
(D) 4
40. Sebastian finished $\frac{1}{3}$ of his homework assignment between 6:00 p.m. and 7:30 p.m. He needs to finish the assignment by 11:00 p.m. If he works at the same rate, what is the latest time that he can return to his homework?
- (A) 7:45 p.m.
(B) 8:00 p.m.
(C) 8:30 p.m.
(D) 9:30 p.m.

41. Four points are labeled on the line segment below.



The distance from A to D is 55, and the distance from A to B is equal to the distance from C to D. If the distance from A to B is twice the distance from B to C, how far apart are B and D?

- (A) 11
(B) 30
(C) 33
(D) 44
42. Two supplementary angles have measurements of $3x$ and $7x$, respectively. What is the measurement in degrees of the smaller angle of the pair?
- (A) 18
(B) 54
(C) 90
(D) 126

Questions 43 and 44 refer to the graph.

The graph shows the amount of money Kiran, Arianna, and Dakota saved by the end of the summer.

SUMMER SAVINGS

= \$50



43. Arianna's summer savings are greater than Kiran's summer savings by how many dollars?
- (A) 3
(B) 4
(C) 150
(D) 200

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B

44. The amount of money saved by Dakota is how many times the amount of money saved by Kiran?
- (A) 4
(B) 8
(C) 100
(D) 400
45. If 20 percent of J is 1,500, what is 15 percent of J ?
- (A) 1,125
(B) 3,000
(C) 5,125
(D) 6,000
46. If $x - y = 5$ and $4x + 6y = 20$, then what is the value of $x + y$?
- (A) 3
(B) 4
(C) 5
(D) 6
47. A bag contains eight white, four red, seven green, and five blue marbles. Eight marbles are pulled out of the bag randomly. How many of the withdrawn marbles were white if the chance of drawing a white marble is now $\frac{1}{4}$?
- (A) 0
(B) 3
(C) 4
(D) 5

STOP. IF THERE IS TIME, YOU MAY CHECK YOUR WORK IN THIS SECTION ONLY.

STOP

Mathematics Achievement

47 questions

40 minutes

Each math question has four answer choices after it. Choose the answer choice that best answers the question.

Make sure that you fill in the correct answer on your answer sheet. You may write in the test booklet.

SAMPLE QUESTION:

1. Which number can be divided by 4 with nothing left over?

(A) 6

☒ 12

(C) 15

(D) 22

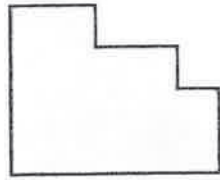
Since 12 can be divided by 4 with no remainder, circle B is filled in.

STOP

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C

1. In the coordinate grid below, the area of each square is 4 in^2 .



What is the area of the shaded region?

- (A) 16 in^2
(B) 20 in^2
(C) 64 in^2
(D) 80 in^2
2. A bag contains 6 red marbles, 4 green marbles, and 5 yellow marbles. Alexis draws one marble from the bag and then returns it to the bag. She then draws a second marble. What is the probability that both marbles will be green?
- (A) $\frac{1}{4}$
(B) $\frac{4}{15}$
(C) $\frac{1}{4} \times \frac{1}{4}$
(D) $\frac{4}{15} \times \frac{4}{15}$
3. Which of the following is equivalent to $4.3 \times 10^{-3} + 5.6 \times 10^{-5}$?
- (A) 9.9×10^{-8}
(B) 5.643×10^{-5}
(C) 4.356×10^{-5}
(D) 4.356×10^{-3}

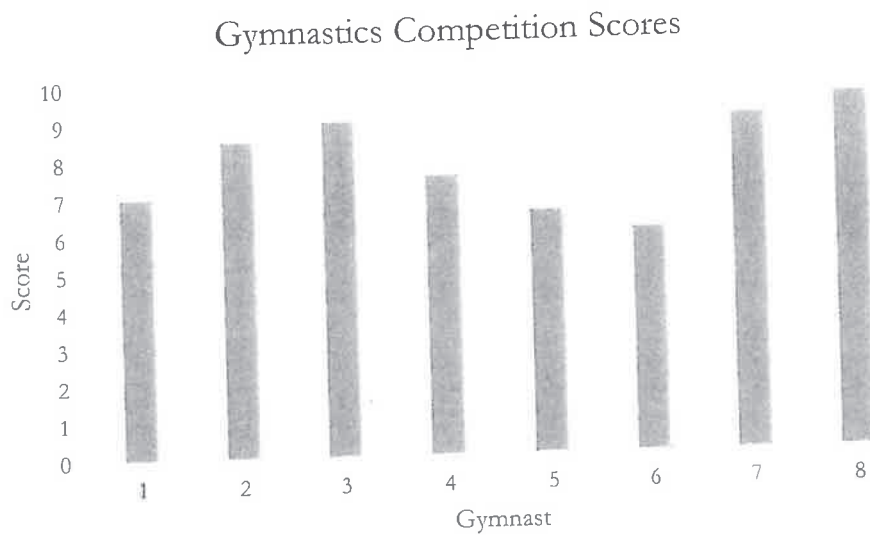
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4. Which value is NOT equal to $\frac{1}{3}$?
- (A) $\frac{0.5}{1.4}$
- (B) $\frac{1.5}{4.5}$
- (C) $0.333333\overline{3}$
- (D) $0.3\overline{3}$
5. If $\frac{2}{3}x = \frac{3}{2}x$, then what is the value of x ?
- (A) $-\frac{3}{2}$
- (B) 0
- (C) 1
- (D) $\frac{3}{2}$
6. If $\frac{2}{w} \times \frac{w}{2} = 1$, then what value(s) of w makes the equation true?
- (A) 2 only
- (B) all real numbers
- (C) all real numbers except 0
- (D) there are no values for w that would make the equation true
7. Which number is equal to $\sqrt{16 + 9}$?
- (A) 5
- (B) 7
- (C) 12
- (D) 25

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8. Scores for each competitor at a gymnastics competition are shown in the following column graph.



What was the median score of the competition?

- (A) 6.0
(B) 7.0
(C) 8.0
(D) 9.0
9. Annie and Sylvia have a dog walking business. Yesterday, Annie walked twice as many dogs as Sylvia did. If they walked a total of 18 dogs, how many dogs did Annie walk?
- (A) 6
(B) 9
(C) 10
(D) 12

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10. Ms. Griffith figured out that the mean test score for her five students on the last test was 85. Now she can only find four of the test papers. The scores on the papers that she can find were 92, 95, 84, and 72. What was the score on the fifth student's test paper?
- (A) 82
(B) 85
(C) 88
(D) 92
11. For her science project, Mona counted the number of butterflies that were in her backyard each day for a month.

Butterflies Counted Each Day

Number of Butterflies	Number of Days
0	8
1	6
2	4
3	6
4	4
7	1
10	2

What is the mode of the data?

- (A) 0
(B) 1
(C) 6
(D) 8
12. What is the greatest common factor of $6r^3t$ and $3r^2t^2$?
- (A) $3rt$
(B) $3r^2t$
(C) $6r^2t$
(D) $18r^3t^2$

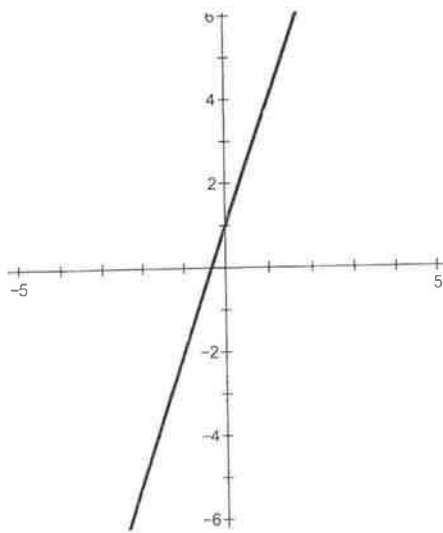
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13. If $4m - 4 = mz - z$, where $m \neq 1$, then what is the numerical value of z ?
- (A) -4
(B) 0
(C) 1
(D) 4
14. If b and c are both prime numbers, then what is the least common multiple of $2n^2$, $4nm^2$, and $6m$?
- (A) $8nm$
(B) $8n^2m^2$
(C) $12m^2n^2$
(D) $24m^2n^2$
15. Which is equivalent to the expression $3u^3v^2 - 4u^2v^3 - (2u^2v^3 + 4u^3v^2)$?
- (A) $7u^3v^2$
(B) $-6u^2v^3$
(C) $7u^3v^2 - 6u^2v^3$
(D) $-6u^2v^3 - u^3v^2$
16. If $\frac{x^3-8}{(x-5)(x+3)}$ is undefined, then what are the possible value(s) of x ?
- (A) $x = 5$ and $x = -3$
(B) $x = -5$ and $x = 3$
(C) $x = 2$, $x = 5$ and $x = -3$
(D) $x = 2$ only
17. Which expression is equivalent to $x^2 - 16$?
- (A) $(x - 4)^2$
(B) $(x + 4)(x - 4)$
(C) $(x + 4)^2$
(D) $(x + 2)(x - 8)$

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18. A line is plotted in the following coordinate grid.



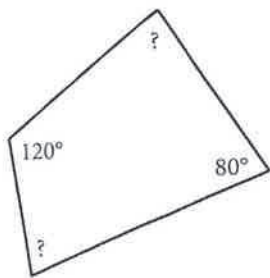
What is the slope of the line?

- (A) -3
(B) $-\frac{1}{3}$
(C) $\frac{1}{3}$
(D) 3
19. The points $(4, 5)$ and $(8, 7)$ are the endpoints of a diameter of a circle. What are the coordinates of the center of this circle?
- (A) $(4, 7)$
(B) $(6, 6)$
(C) $(7, 4)$
(D) $(12, 12)$

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20. A television station wants to predict who will win the next local election. Surveying which group of people would allow the television station to make the most accurate prediction?
- (A) viewers who call in to the television station
 - (B) a random sample of all the people who watch that television station
 - (C) donors to the television station
 - (D) a random sample of registered voters in the local area
21. What is the distance between the points (3, 8) and (6, 10)?
- (A) $\sqrt{13}$ grid units
 - (B) $\sqrt{26}$ grid units
 - (C) 6 grid units
 - (D) 8 grid units
22. The following figure shows a quadrilateral with the measures of two of its angles.



What is the sum of the measures of the other two angles?

- (A) 70°
- (B) 80°
- (C) 120°
- (D) 160°

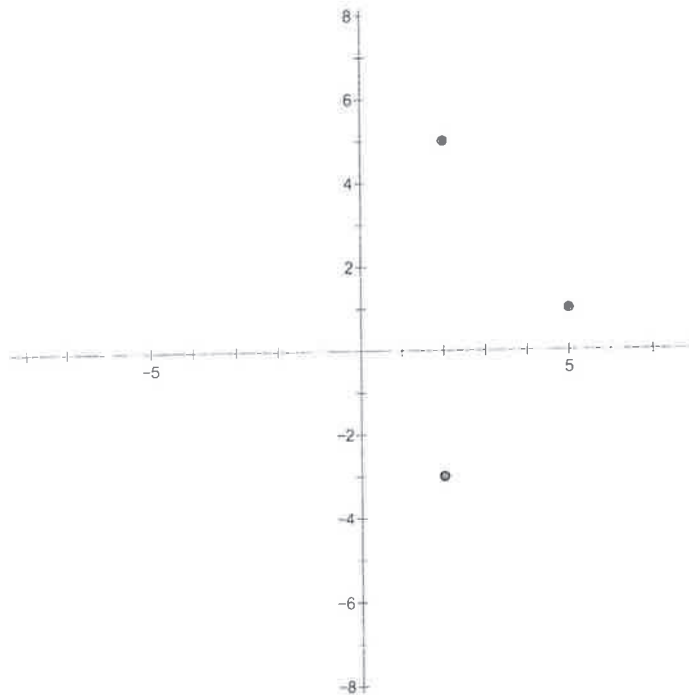
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23. There are 5 members of the table tennis team. Only two members may play in an upcoming tournament. How many different two-person combinations can be formed from the 5-member team?

(A) 2
(B) 5
(C) 10
(D) 20

24. Three vertices of a rhombus are plotted on the following coordinate grid.



Which of the following coordinates could be the fourth vertex?

(A) (1, 1)
(B) (-1, 1)
(C) (2, 3)
(D) (8, 5)

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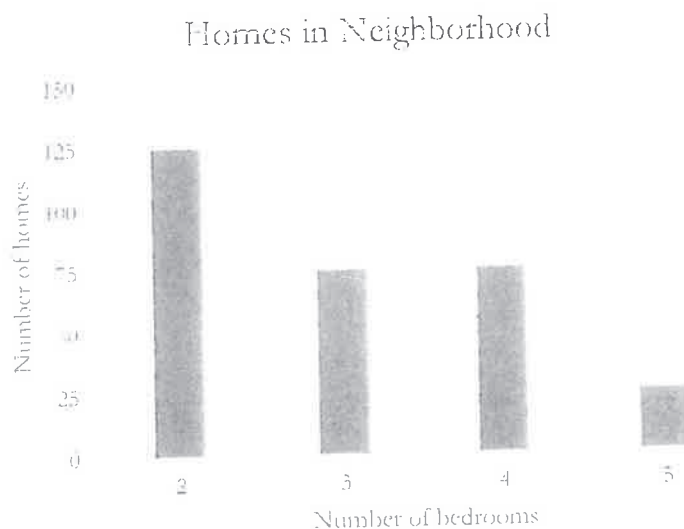
25. What are the values of m that make the inequality $|4m - 2| \leq 10$ true?

- (A) $m \leq 3$
- (B) $m \geq -2$
- (C) $m \leq 3$ or $m \geq -2$
- (D) $-2 \leq m \leq 3$

26. The sum of two irrational numbers could NOT produce what type of number?

- (A) rational number
- (B) integer
- (C) complex number
- (D) irrational number

27. The following column graph shows the number of homes in a neighborhood by the number of bedrooms in each home.



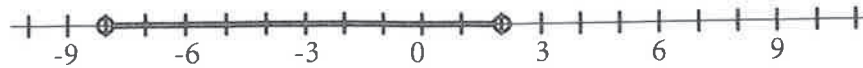
What is the mean number of bedrooms for homes in the neighborhood?

- (A) 2
- (B) 3
- (C) 3.5
- (D) 5

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28. A solution set is shown on the following number line.



What is the inequality that is represented?

- (A) $|n - 5| < 3$
 (B) $|n + 5| < 3$
 (C) $|n + 3| < 5$
 (D) $|n - 5| > 3$
29. Kathryn plans to flip a quarter four times. She created the following table with all of the possible outcomes and the probability of each.

Results of Flipping Quarter

Number of Heads	Probability
0	$\frac{1}{16}$
1	$\frac{1}{4}$
2	$\frac{3}{8}$
3	$\frac{1}{4}$
4	$\frac{1}{16}$

What is her expected number of heads out of the four coin tosses?

- (A) $\frac{3}{8}$
 (B) 1
 (C) 2
 (D) 4

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30. There are 60 seconds in a minute and 60 minutes in an hour. There are also 5,280 feet in a mile. If a racecar is traveling at 120 miles per hour, which expression could be used to figure out how fast the car is going in feet per second?

- (A) $\frac{120 \times 5,280}{60 \times 60}$
(B) $\frac{120 \times 60 \times 60}{5,280}$
(C) $\frac{120 \times 60}{5,280 \times 60}$
(D) $\frac{60 \times 60}{120 \times 5,280}$

31. Which expression is NOT equal to an integer?

- (A) $\sqrt{6} + \sqrt{6}$
(B) $\sqrt{6} - \sqrt{6}$
(C) $\sqrt{6} \times \sqrt{6}$
(D) $\sqrt{6 \times 6}$

32. The table below shows the results of a student survey. 120 students were asked what their favorite ice cream flavor is.

Favorite Ice Cream Flavor	Number of Students
Vanilla	36
Chocolate	40
Strawberry	24
Other	20

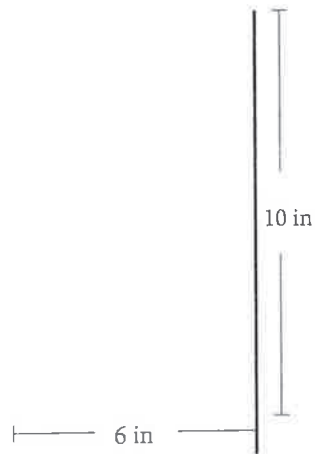
If a circle graph was made from this data, what would be the measure of the central angle of the section representing students who chose vanilla as their favorite ice cream flavor?

- (A) 36°
(B) 108°
(C) 120°
(D) 240°

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33. Mr. Boyd has a model of a sailboat with a sail that is 6 inches wide and 10 inches tall, as shown in the following figure.



- If he wants to build a full-size version of the sailboat with a sail that is 15 feet wide, how tall should the sail be?
- (A) 10 feet
(B) 25 feet
(C) 40 feet
(D) 55 feet
34. Which of the following would be the best unit to use when measuring the length of a school bus?
- (A) meters
(B) centimeters
(C) kilograms
(D) liters

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35. A square has sides 8m long, and a circle is inscribed in the square as illustrated in the following figure.



What is the area of the shaded region of the figure, in m^2 ?

- (A) $32 - 8\pi$
 - (B) $32 - 16\pi$
 - (C) $64 - 16\pi$
 - (D) $64 - 64\pi$
36. Below are the first four terms of an arithmetic sequence.

$-2, 2, 6, 10$

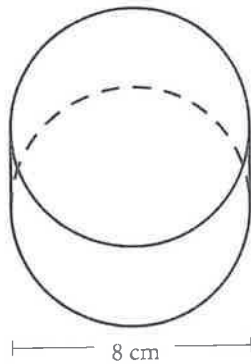
Which expression could be used to figure out the n th term in this sequence?

- (A) $n - 3$
- (B) $n + 1$
- (C) $4n - 4$
- (D) $4n - 6$

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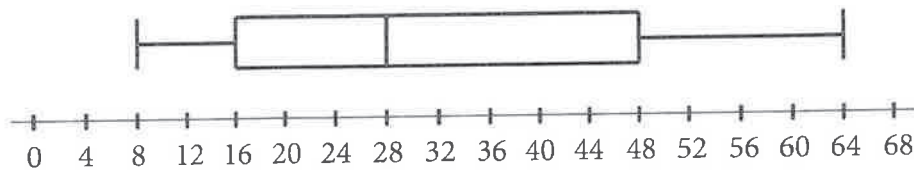
C

37. A cylinder has height, h , equal to half of its diameter. The diameter of the cylinder, shown in the following figure, is 8 cm.



Given that the formula for the volume, V , of a cylinder is $V = r^2 h \pi$ (r = the radius), what is the volume of the cylinder shown in cm^3 ?

- (A) 64π
 (B) 128π
 (C) 256π
 (D) 512π
38. Penny created the box and whisker plot that follows to summarize the total annual rainfall data in her state from the last 100 years.



What is the range of the data?

- (A) 12
 (B) 20
 (C) 28
 (D) 56

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39. Yesterday, Sally had a collection of 150 pencils. Today, she has twice as many pencils. By what percent did her collection increase?
- (A) 50%
(B) 100%
(C) 150%
(D) 200%
40. Two spinners are divided into six equal sections labeled #1-6. Which scenario describes complementary events?
- (A) The probability of landing on a 2 and then a 4
(B) The probability of landing on a 3 and then landing on an even number
(C) The probability of landing on a number less than 3 and then landing on a number greater than 3
(D) The probability of landing on an even number and then landing on an odd number
41. Kim surveyed her friends to find out how many times they went swimming over the summer. She put her results into the stem-and-leaf plot below.

```
0 | 3 3 5 6 7
1 | 0 0 2 3 3 3 5 8
2 | 2 4 4 9
3 | 0 3 9
5 | 4
```

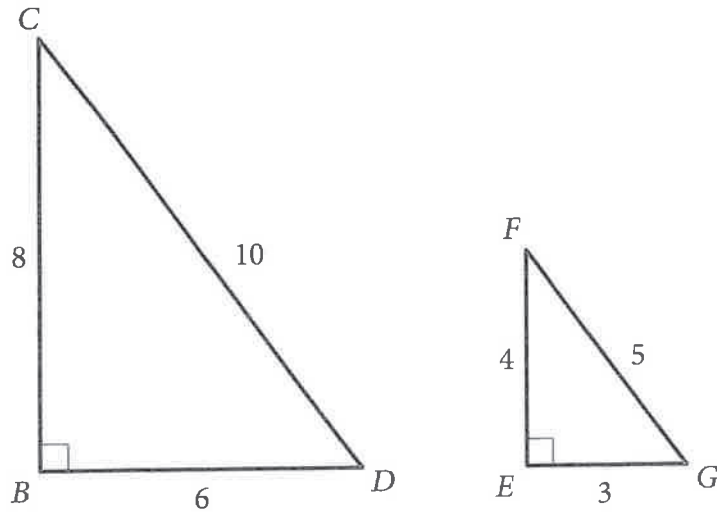
What was the mode for this set of data?

- (A) 3
(B) 9
(C) 13
(D) there is no mode for this data

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42. Triangle BCD is similar to triangle EFG .



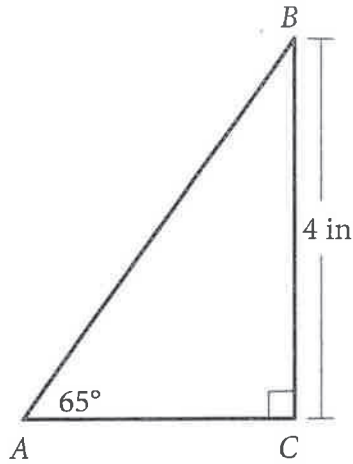
What is the ratio of the length of one side of triangle BCD to the corresponding side of triangle EFG ?

- (A) 3 to 1
- (B) 2 to 1
- (C) 1 to 3
- (D) 1 to 2

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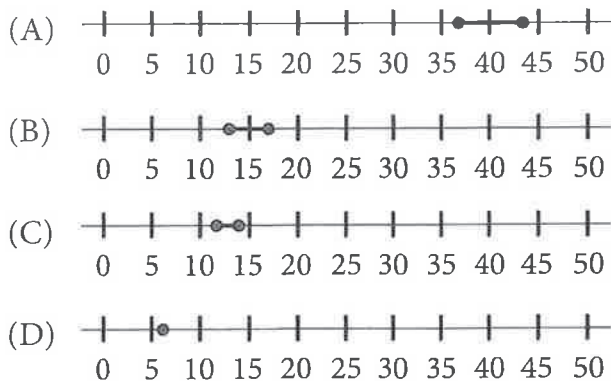
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43. The figure that follows shows triangle ABC . The length of side BC is 4 inches, and angle BAC measures 65° .



Which of the following expressions is equal to the length of side AB , in inches?

- (A) $\frac{4}{\sin 65^\circ}$
 (B) $4 \times \sin 65^\circ$
 (C) $\frac{\sin 65^\circ}{4}$
 (D) $\frac{\sin 65^\circ}{\cos 65^\circ}$
44. Which of the following graphs represents the inequality $37 \leq 3n + 1 \leq 43$?



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45. The solution set for $m^2 + 36 = 0$ is

- (A) 6
- (B) $6i$
- (C) ± 6
- (D) $\pm 6i$

46. What is the result of the sum $\begin{bmatrix} 4 & 2 \\ 7 & 0 \end{bmatrix} + \begin{bmatrix} 3 & 0 \\ 1 & 4 \end{bmatrix}$?

- (A) $\begin{bmatrix} 7 & 2 \\ 8 & 4 \end{bmatrix}$
- (B) $\begin{bmatrix} 7 & 2 \\ 7 & 4 \end{bmatrix}$
- (C) $\begin{bmatrix} 4 & 0 \\ 7 & 4 \end{bmatrix}$
- (D) $\begin{bmatrix} 4 & 2 \\ 1 & 4 \end{bmatrix}$

47. The formula for the volume of a right cylinder is given by the formula $V = \pi r^2 h$, where r represents the length of the radius and h represents the height. If a cylinder has a height of 8 cm and a volume of 32π cm², what is the radius of this cylinder?

- (A) 1 cm
- (B) 2 cm
- (C) 4 cm
- (D) 16 cm

STOP

IF YOU HAVE TIME LEFT YOU MAY CHECK YOUR ANSWERS IN THIS SECTION ONLY