

TEST NAME: **Math 1 8th EE.7**
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Student: _____

Class: _____

Date: _____

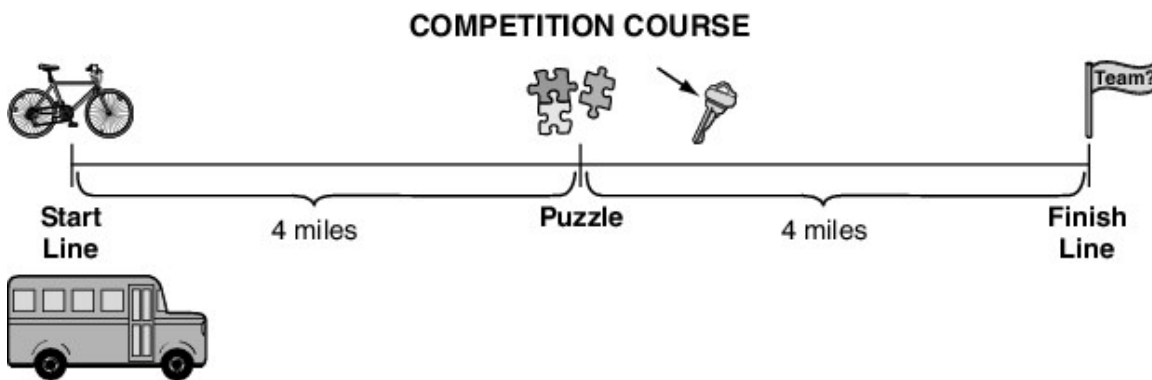
Read the passage - 'Race to the Finish' - and answer the question below:

Race to the Finish

Race to the Finish

"Ready, set, go!"

The team competition has just begun. Two teams have to make their way across an 8-mile course. There is a puzzle in the middle of the course that will need to be solved to retrieve a key. This key will be used to raise a team flag at the end of the course. The first team to raise its flag will be the winner. A course map of the competition is shown below.



The first decision the teams need to make is what transportation they are going to use throughout the competition. They can walk, ride bikes, or take the bus. Both teams are given the following information to help them weigh their options.

1. A person walks at an average speed of about 3 miles per hour (mph).
2. A person rides a bike at an average speed of about 12 mph.
3. The bus travels at a much faster speed, but you may have to wait up to 10 minutes for it to arrive.

Those on team 2 make their decision immediately. They choose to take the bus because it has the fastest speed. Members of team 1 discuss the possibility of having to wait for the bus to arrive, but they are not willing to risk losing the valuable time. They jump on the bikes and take off.

As it turns out, those on team 2 have to wait 6 minutes for the bus to arrive before it takes them to the site of the puzzle. It takes them a total of 14 minutes from the start of the race to arrive at the puzzle and only 7 minutes to complete their puzzle. They are able to catch the bus immediately to take them to the finish line and they arrive after 29 minutes from the start of the race. It seems as if luck is on their side.

Members of team 1, on the other hand, struggle with their puzzle, which takes them 13 minutes to complete. They already saw team 2 catch the bus

several minutes ago and are convinced that there is no way to catch up on their bikes. They are feeling defeated but want to complete the event, so they jump on their bikes and head toward the finish line. Little do they know they still have a chance of finishing first.

As those on team 2 arrive at the finish line, they jump off the bus. They are excited to get there first and eager to use the key to raise their victory flag. But there is a big problem. They forgot the key that they received when they completed the puzzle. Now, they are unable to raise their flag. Luckily, they are able to get back on the bus before it leaves the finish line. They even convince the bus driver to take them back to get their key and then back to the finish line, but will the bus be fast enough to get them there and back before members of team 1 arrive on their bikes?

1. Read "Race to the Finish" and answer the question.

Consider the alternative scenarios listed below regarding the first leg of the race (when the teams are traveling to the puzzle site).

Scenario A: Both teams decide to take the bus and end up on the same bus.

Scenario B: Both teams decide to take the bikes and travel at the same average speed, but one team leaves earlier than the other.

If equations were written for each of these scenarios to find out at how many minutes the teams would be the same distance from the start line at the same time, how many solutions would each of these equations have?

Read the passage - 'Race to the Finish' - and answer the question below:

2. Read "Race to the Finish" and answer the questions.

During the first leg of the race, when the teams are traveling to the site of the puzzle, the distance of team 1 from the start line can be represented by the equation $d_1 = s_b \times t$, and the distance of team 2 from

the start line can be represented by the equation $d_2 = \frac{5}{2} \times s_b \times \left(t - \frac{1}{10}\right)$

, where t represents the number of hours since the race began, s_b represents the average speed of the bike riders in miles per hour, and the average speed of the bus is two and one-half times faster than that of the bikes.

Part A. Use the equations given above and the information in the passage to write and solve an equation to determine the time, t , when both teams are the same distance from the start line.

Part B. What does this solution mean in regard to the race?

Use words, numbers, and/or pictures to show your work.

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3. An equation is given below.

$$6 - 2(4 - x) + 3x = 5x - 2$$

Based on the equation, which of the following is a valid statement?

- A. The only value that satisfies the equation is $x = 0$.
 - B. The only value that satisfies the equation is $x = 3$.
 - C. There are no values of x that satisfy the equation.
 - D. Any real number value of x satisfies the equation.
4. Which of these equations does NOT have any solutions?
- A. $10 - 3x - 1 = 7 + 3x + 2$
 - B. $12 - 7x - 10 = x - 8x + 2$
 - C. $13 - 4x + 2 = 3x - 7x + 2$
 - D. $15 - 2x - 2 = 10x + 3x + 2$

5. Which equation has an infinite number of solutions?
- A. $12 = 3y$
 - B. $8q + 5 = 21$
 - C. $2x + 7 - 2x = 7$
 - D. $4p - 4 = 4p + 4$
6. A student concluded that $8x - 12 = 4\left(\frac{1}{2}x - 6\right)$ has infinitely many solutions. Which statement best describes the student's conclusion?
- A. The conclusion is incorrect because the equation has no solution.
 - B. The conclusion is incorrect because there is exactly one solution to the equation.
 - C. The conclusion is correct because there are exactly two solutions to the equation.
 - D. The conclusion is correct because when simplified, both sides of the equation are equivalent.
7. How many solutions does the equation $5(x - 2) = 8 + 5x$ have?
- A. no solution
 - B. one solution
 - C. two solutions
 - D. infinitely many solutions
8. Which equation has no solution?
- A. $-5 + 8x - 9 = 3(x + 3)$
 - B. $-2(6 - 3x) = -12 + 6x$
 - C. $6 - 2(3 - 2x) = -4(3 - x)$
 - D. $-(4x + 9) = 2x - 3(2x + 3)$
9. Which statement correctly describes the solution(s) of the equation below?
- $$-2 + x - 3 = 2x + 5 - x$$
- A. The equation has one solution, which is -5 .
 - B. The equation has one solution, which is 5 .
 - C. The equation has infinitely many solutions.
 - D. The equation has no solution.

10. Which statement regarding the number of solutions for the linear equation shown below is true?

$$4(3x + 8) - 9 = 2(6x - 8) + 39$$

- A. There are infinitely many solutions.
- B. There are exactly two solutions.
- C. There is exactly one solution.
- D. There is no solution.

11. How many solutions does the equation $3x - 7 = 2x - 1 + x + 7$ have?

- A. 0
- B. 1
- C. 2
- D. infinitely many

12. Which equation has only one solution?

- A. $6r = 5r + r$
- B. $4m + 5 = 25$
- C. $8v + 11 = 8v + 11$
- D. $2 - 3p = -3p + 5$

13. Which equation has no solution?

- A. $3k - 20 = 12$
- B. $8 + 15g = 15 + 8g$
- C. $12x + 6 = 3(4x + 2)$
- D. $9p + 7 = 6p - 2 + 3p$

14. Kiera is comparing the cost of two swimming pool memberships to determine which she will buy. Pool K charges a \$30 membership fee plus \$5 per visit. Pool M charges a \$10 membership fee plus \$10 for every two visits.

Part A. For each pool, write an equation that represents C , the total cost for n visits. Identify the slope and intercept of each equation.

Part B. Use comparative language (greater than, less than, equal to) to describe the relationships between

- the slope of the equation representing Pool K and the slope of the equation representing Pool M
- the intercept of the equation representing Pool K and the intercept of the equation representing Pool M

Part C. For what value of n , if any, are the costs of both plans equal? Show or explain your work.

Part D. Generalize your response to Part C to apply to any system of equations with slopes and intercepts that have the relationships you found in Part B.

15. How many solutions does the equation $3x - 2x + 4 = 2 + x + 2$ have?

- A. no solution
- B. one solution
- C. two solutions
- D. infinitely many solutions

16. How many solutions does the equation $3y + 5 = 7 + 3y - 9$ have?

- A. infinitely many solutions
- B. exactly 2 solutions
- C. exactly 1 solution
- D. no solutions

17. The equation $-2x + 3 = 6 - 2x$ has no solution. Which step would change the given equation so that it has infinitely many solutions?
- A. adding 3 to the left side of the equation
 - B. adding 6 to the left side of the equation
 - C. subtracting 3 from the left side of the equation
 - D. subtracting 6 from the left side of the equation

18. Four students each wrote an equation.

Student Equations

Student	Equation
Beto	$3m = 3m + 5$
Lila	$9r + 4 = 4 + 9r$
Mark	$6 - n = -n + 2$
Wanda	$8u - 2 = 2u + 8$

Which two students wrote equations that have no solution?

- A. Beto and Wanda
 - B. Beto and Mark
 - C. Lila and Wanda
 - D. Lila and Mark
19. How many solutions does the equation $2(x + 4) = 2x + 8$ have?
- A. no solutions
 - B. one solution
 - C. two solutions
 - D. infinite solutions
20. Which equation has infinitely many solutions?
- A. $8x = 8(x - 1) + 1$
 - B. $2x - 5 = 2(x - 5)$
 - C. $22 - 6x = 2(3x - 11)$
 - D. $3(5x - 4) - 8x = 7x - 12$

21. Which statement regarding the number of solutions for the linear equation shown below is true?

$$\frac{1}{4}x - 13 = \frac{1}{4}(x + 13)$$

- A. There is no solution.
- B. There is exactly one solution.
- C. There are exactly two solutions.
- D. There are infinitely many solutions.

22. Which of the following equations has no solution?

- A. $7x - 3x - 4 = 4$
- B. $7x - 3x + 4 = 4$
- C. $3(2x - 4) = 6(x - 2)$
- D. $3(2x - 4) = 6(x + 2)$

23. Which equation has an infinite number of solutions?

- A. $7(1 - 4x) + 3x = 7$
- B. $5(2 - 4x) + 4x = 10$
- C. $8(2 - 2x) + 16x = 9$
- D. $6(3 - 2x) + 12x = 18$

24. The equation $9 + 3a - 4 = \square a + 20 - 15$ has infinitely many solutions. What value should be placed in the box?

- A. 0
- B. 1
- C. 3
- D. 5

25.

26.

27.

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39.

40. What value of x makes the equation below true?

$$2(x + 5) = 6x + 2$$

A. $\frac{1}{2}$

B. $\frac{3}{4}$

C. 1

D. 2

41. One of the tires on the truck Ian is rebuilding has a slow leak. The recommended inflation pressure of the tire is 35 pounds per square inch (psi). Due to the leak, the tire loses approximately 3 psi of pressure each day. The equation below can be used to determine I , the tire's inflation pressure when d days have passed since it was properly inflated.

$$I = 35 - 3d$$

How many days have passed if the tire's inflation is approximately 11 psi?

- A. 3
- B. 8
- C. 15
- D. 24

42. Martina is solving the equation $4x - 11 = 2x + 391$. Here are the first steps of her solution.

$$4x - 11 = 2x + 391$$

$$4x = 2x + 402$$

$$2x = 402$$

What did Martina do to get $2x = 402$?

- A. divided both sides by 2
- B. divided the left side by $2x$
- C. subtracted $2x$ from both sides
- D. subtracted $2x$ from the left side and added $2x$ to the right side

43. Sara was asked by Mr. Rocha to solve the equation below.

$$-3x = y + 51$$

What is the value of x when y has a value of -9 ?

- A. -20
- B. -14
- C. 14
- D. 20

44. What is the value of t in the equation $3(t - 4) = 2t + 1$?

- A. -3
- B. -2
- C. 5
- D. 13

45. Which of the following equations is equivalent to $3(4x - 9) = 28$?

- A. $12x - 6 = 28$
- B. $12x - 9 = 28$
- C. $12x - 27 = 28$
- D. $12x - 18 = 28$

46. Solve for x .

$$\frac{1}{2}x - 2 = 2(-x + 1)$$

A. $-\frac{8}{3}$

B. $\frac{8}{5}$

C. $\frac{6}{5}$

D. 2

47. Which equation is equivalent to $\frac{2}{3}(x - 6) + 1 = x - 2$?

A. $\frac{2}{3}x - 3 = x - 2$

B. $\frac{2}{3}x - 5 = x - 2$

C. $2x - 17 = x - 2$

D. $2x - 11 = 3x - 2$

48. Which equation is equivalent to $\frac{-20x}{2} - x = 1$?

A. $-11x = 1$

B. $-10x = 1$

C. $10x = 1$

D. $11x = 1$

49. What is the value of w in the equation $6w + 36 = 2w$?

A. -9

B. 4

C. 9

50. If $-3x = 57$, what is the value of x ?

A. -171

B. -19

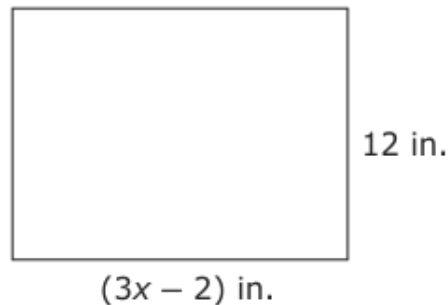
C. 54

D. 60

51. Which equation is equivalent to $6x - 3 + 4x = 5 + 3x + 4$?

- A. $2x - 3 = 3x + 9$
- B. $2x - 3 = 8x + 4$
- C. $10x - 3 = 3x + 9$
- D. $10x - 3 = 8x + 4$

52. The perimeter of the rectangle below is 56 in.



What is the value of x ?

- A. 6
- B. 12
- C. 18

53. The average high temperature in Valerie's city during the month of December is 50°F . Using the formula

$F = \frac{9}{5}C + 32$, what is C , the average high temperature in degrees Celsius?

- A. 10°C
- B. 32.4°C
- C. 45.5°C
- D. 122°C

54. A hexagon has two sides that are equal. The two equal sides are 2 inches longer than each of the four other sides. The perimeter of the hexagon is 22 inches. What is the measure of one of the shorter sides?

- A. 2 inches
- B. 3 inches
- C. 4 inches
- D. 5 inches

55. The average high temperature in Miami, Florida, during the month of December is 77°F. What is this temperature in degrees Celsius? (Use $F = \frac{9}{5}C + 32$)

- A. 25°C
- B. 60.6°C
- C. 81°C
- D. 170.6°C

56. What is the value of k in the equation below?

$$7^2 + 14^2 = 49k$$

- A. 2
- B. 3
- C. 4
- D. 5

57. Which equation is equivalent to $3(x - 5) = 4x$?

- A. $3x - 5 = 4x$
- B. $3x - 5 = 12x$
- C. $3x - 15 = 4x$
- D. $3x - 15 = 12x$

58. What is the solution to the equation $-2(6x + 8) + 7x = 3x - 2(12 + 4x)$?

- A. infinitely many solutions
- B. no solution
- C. $x = 2$
- D. $x = 3$

59. What is the solution to the equation?

$$-4x - 12 = -11x + 23$$

- A. -5
- B. $-\frac{7}{3}$
- C. $\frac{7}{3}$
- D. 5

60. What is the first step to solve for q in the equation $8q + 6 = 72$?

- A. $8q + 6 + 6 = 72 + 6$
- B. $8q + 6 - 6 = 72 - 6$
- C. $\frac{8q+6}{8} = \frac{72}{6}$
- D. $8 \times (8q + 6) = 72 \times 8$

61. Which of the following equations can be solved for x in one step by multiplying both sides of the equation by 2?

- A. $x - 2 = -17$
- B. $x + \frac{1}{2} = -17$
- C. $2x = -17$
- D. $\frac{1}{2}x = -17$

62. If $44 \div 2 = n + 8$, what is the value of n ?

- A. 14
- B. 22
- C. 30
- D. 80

63. Which property can be used to justify that $2x^2 + 5x(-4x + 8) = 2x^2 - 20x^2 + 40x$?

- A. associative property
- B. distributive property
- C. commutative property
- D. addition property of equality

64. What is the value of x in the equation below?

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

- A. 3
- B. 1
- C. -7

65. Which of the following is the slope-intercept form of the equation $3y = 2(x - 6)$?

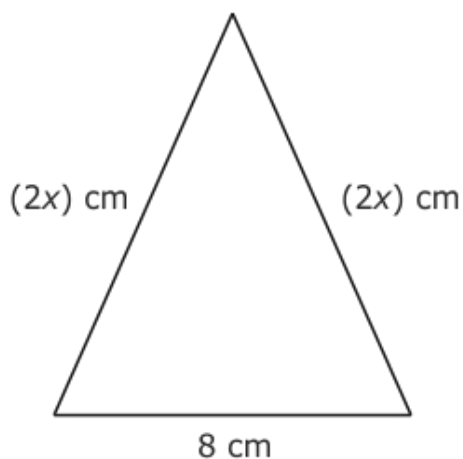
- A. $x = \frac{3}{2}y + 6$
- B. $y = \frac{2}{3}x - 4$
- C. $3y = 2x - 12$
- D. $2x - 3y = 12$

66. The cost of production for boxes of markers is \$500.00 to set up equipment plus \$0.35 per box for materials. A box of markers sells for \$2.85. How many boxes of markers must be sold for the company's income to equal the cost of production?
- A. 150
B. 175
C. 200
D. 250
67. Jared went snorkeling in one lake that was 52 feet deep and in another lake that was 12 feet deeper. The deeper lake was twice as deep as Lake Masuki. In the equation below, d represents the depth in feet of Lake Masuki.
- $$52 + 12 = 2d$$
- How deep is Lake Masuki?
- A. 32 feet
B. 64 feet
C. 128 feet
D. 256 feet

68. What is the value of x in the equation $3(x + 4) + 3 = 9$?
- A. -2
B. -1
C. 5
D. 8

69. Which value of x satisfies the equation $2(5x + 1) - 2x = 2 - 2(3x + 1)$?
- A. $-\frac{1}{4}$
B. $-\frac{1}{7}$
C. $\frac{1}{9}$
D. $\frac{1}{7}$

70. The perimeter of the triangle below is 28 cm.



What is the value of x ?

- A. $x = 5$
- B. $x = 7$
- C. $x = 9$

71. Which equation is equivalent to $-2(x + 3) - 4x = 10$?

- A. $-6x - 3 = 10$
- B. $-6x + 3 = 10$
- C. $-6x - 6 = 10$
- D. $-6x + 6 = 10$

72. Which of the following equations would be solved for x by adding 8 to both sides and then multiplying both sides by 2?

- A. $5 = \frac{1}{2}x + 8$
- B. $5 = \frac{1}{2}(x + 8)$
- C. $5 = \frac{1}{2}x - 8$
- D. $5 = \frac{1}{2}(x - 8)$

73. What is the value of x in the equation $13x - 2(6x - 4) = 72$?

- A. 64
- B. 68
- C. 76
- D. 80

74. Which equation is NOT equivalent to $-3(15x - 9) = 18$?

- A. $-45x = -9$
- B. $-5x = 1$
- C. $5x = 1$
- D. $45x = 9$

75. Use the equation $\frac{3.5z + 15}{4} = 7.2 + 2.6z$ to answer the questions below.

Part A. Solve the equation for z .

Part B. Substitute the value of z into the original equation to check your answer. Explain why your answer is or is not correct.

Use words, numbers, and/or pictures to show your work.

76. Three times a number minus 8 is equal to 5 times the same number plus 10. What is the number?

- A. -9
- B. 1
- C. 9

77. The equation $S = 180n - 360$ gives the sum of the interior angles of an n -sided polygon. Josh wants to reverse the process by finding the number of sides of a polygon when the sum of the interior angles is given. Which equation below will allow him to do this correctly?

- A. $n = 180S + 2$
- B. $n = 180S - 2$
- C. $n = \frac{1}{180}S + 2$
- D. $n = \frac{1}{180}S - 2$

78. What is the solution to the equation $2(3x + 1) + 2x = 8x + 1$?

- A. 1
- B. 2
- C. no solution
- D. all real numbers

79. The table below shows the steps a student used to solve the equation. At least one step contains an error.

$$7 + 8x = 0$$

Step 1: $7 + 8x - 7 = 0 - 7$

Step 2: $8x = -7$

Step 3: $\frac{8x}{8} = -7(8)$

Step 4: $x = -56$

What is the first step that contains an error?

- A. Step 1
- B. Step 2
- C. Step 3
- D. Step 4

80. What is the value of y in the following equation?

$$-\frac{2}{3}y + 8 = 26$$

- A. -27
- B. -12
- C. 12
- D. 27

81. What value for x makes the equation true?

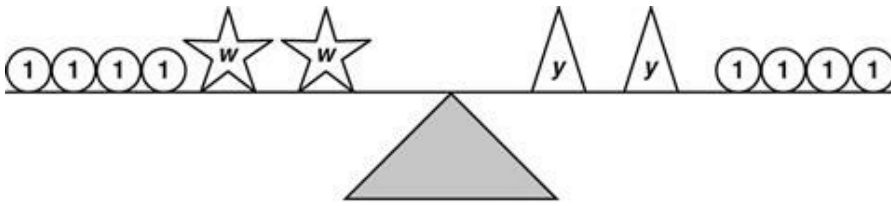
$$\frac{x}{5} + 15 = 25$$

- A. 2
- B. 8
- C. 50
- D. 200

82. What is the solution to the equation $3x + 5 = 5x - 15$?

- A. -10
- B. -5
- C. 10

83. The figure below models the equation $4 + 2w = 2y + 4$.



What is the value of w ?

- A. $w = 2y$
- B. $w = \frac{1}{4}y$
- C. $w = \frac{1}{2}y$
- D. $w = y$

84. Which would be the first step for solving the equation $\frac{6}{7}x + 2 = 18$?

- A. add -2 to both sides of the equation
- B. add 18 to both sides of the equation
- C. divide both sides of the equation by $\frac{7}{6}$
- D. multiply both sides of the equation by $-\frac{7}{6}$

85. What is the solution to the equation $2(2x - 5) = 6$?

- A. 3
- B. 4
- C. 8

86. Which steps could be used to solve for x in the equation $7x + \frac{1}{3} = 2\frac{2}{3}$?

- A. Divide both sides of the equation by $\frac{1}{7}$ and then subtract 3 from both sides of the equation.
- B. Divide both sides of the equation by 7, and then subtract $\frac{1}{3}$ from both sides of the equation.
- C. Subtract $\frac{1}{3}$ from both sides of the equation, and then divide both sides of the equation by 7.
- D. Subtract 3 from both sides of the equation, and then multiply both sides of the equation by 7.

87. What is the value of x in the equation $6(x + 5) = 3(x - 14)$?

- A. -1
- B. -4
- C. -6
- D. -24

88. Bob works as a plumber. He charges \$45.00 for the first hour and \$33.75 for each additional hour. Bob was paid \$247.50 for his last job. How many hours did Bob work on his last job?

- A. 3
- B. 4
- C. 6
- D. 7

89. Cassie sold fewer watches than Darrel. The equation shown can be used to determine d , the number of watches Darrel sold.

$$d = 2c - 7$$

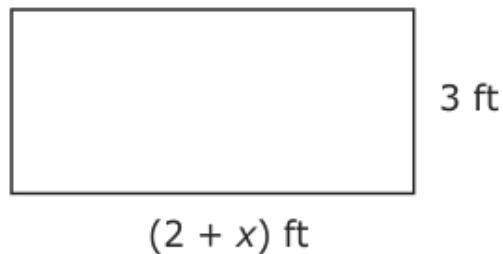
If Cassie sold 54 watches, what number of watches did Darrel sell?

- A. 31
- B. 94
- C. 101
- D. 115

90. What is the solution to $5(x + 1) - 8 = x - 4(2x - 1)$?

- A. 1
- B. $\frac{7}{12}$
- C. $\frac{1}{2}$
- D. -1

91. The perimeter of the rectangle below is 28 ft.



What is the value of x ?

- A. 7
- B. 9
- C. 18
- D. 20

92. Which equation is equivalent to $3 - (x - 5) = 7(x + 2)$?

- A. $-2 - x = 7x + 14$
- B. $-2 - x = 7x + 2$
- C. $8 - x = 7x + 14$
- D. $8 - x = 7x + 2$

93. Which equation is equivalent to $-5(4x + 2 + 3x) = 6$?

- A. $-45x = 6$
- B. $-35x = -20$
- C. $-35x = 16$
- D. $-17x = 4$

94. What is the value of y in the equation $4(5y - 9) - 24y + 70 = 4(1 - 21y)$?

- A. $-\frac{3}{8}$
- B. $-\frac{5}{8}$
- C. $-2\frac{2}{3}$
- D. $-3\frac{1}{3}$

95. If $10p = -720$, what is the value of p ?

- A. 7200
- B. 72
- C. -72
- D. -7200

96. Twice a number m is 32 less than 6 times m . What is the value of m ?

- A. -8
- B. -4
- C. 4
- D. 8

97. What is the value of n in the equation below?

$$2n + 6 = 2n + 10$$

- A. 1
- B. infinitely many solutions
- C. no solution

98. Which equation is equivalent to $\frac{3}{2}(x + 6) - \frac{1}{2}(x - 24) = 16$?

- A. $x - 18 = 16$
- B. $x - 3 = 16$
- C. $x + 3 = 16$
- D. $x + 21 = 16$

99. Which equation is equivalent to $-19 + 6x - 5 = 3x$?

- A. $-6x + 19 - 5 = 3x$
- B. $-6x - 19 - 5 = 3x$
- C. $6x + 19 + 5 = 3x$
- D. $6x - 19 - 5 = 3x$

100. A student will solve for the value of x in the equation $\frac{3}{5}x + \frac{1}{2} = \frac{4}{7}$ in two steps. Which of the following describes the step that is the most appropriate for the student to use first?

- A. Add $\frac{4}{7}$ to both sides of the equation.
- B. Multiply each side of the equation by $\frac{3}{5}$.
- C. Subtract $\frac{1}{2}$ from both sides of the equation.
- D. Subtract $\frac{3}{5}$ from both sides of the equation.

101. What is the value of x in the equation $2x + 9 = 5x - 6$?

- A. -5
- B. 3
- C. 5

102. What is the value of m in the equation below?

$$4(m + 2) = -4(m - 2)$$

- A. 0
- B. no solution
- C. infinitely many solutions

103. Which equation is equivalent to $2x - 9 - 3x = 4$?

- A. $2x - 3x = 4 + 9$
- B. $2x - 9x = 4 + 3$
- C. $3x + 2x = 4 + 9$
- D. $9x - 2x = 4 - 3$

104. What is the solution to the equation shown below?

$$\frac{x+5}{2} = 2(x+3)$$

- A. $-\frac{1}{3}$
- B. -1
- C. -2
- D. $-\frac{7}{3}$

105. Which equation is equivalent to $5(x-3) + 4(x-2) = 7$?

- A. $5x - 15 + 4x - 8 = 7$
- B. $5x - 3 + 4x - 2 = 7$
- C. $5x + 3 + 4x + 2 = 7$
- D. $5x + 15 + 4x + 8 = 7$

106. Which equation is equivalent to $12(4x-5) = 18$?

- A. $4x - 5 = 6$
- B. $4x - 5 = 30$
- C. $48x + 60 = 18$
- D. $48x - 60 = 18$

107. What value for n makes the equation true?

$$\frac{2}{3}n + 2 = -\frac{2}{3}(n - 9)$$

- A. -6
- B. -3
- C. 3
- D. 6

108. If the equation $5(3x+7) - 1 = 3(5x+k) + 4$ has infinitely many solutions, what is the value of k ?

- A. 7
- B. 10
- C. 27
- D. 30

109. Which equation is equivalent to $5 = \frac{4}{3}(6y + 9)$?

- A. $5 = 8y + 3$
- B. $5 = 8y + 9$
- C. $5 = 8y + 12$
- D. $5 = 8y + 36$

110. Which expression is equivalent to $\frac{2}{3}(x - 6) - \frac{1}{3}(x - 3)$?

- A. $\frac{1}{3}x - 3$
- B. $\frac{1}{3}x - 5$
- C. $\frac{1}{3}x - 11$
- D. $\frac{1}{3}x - 1$

111. What is the value of x in the equation $3x - 1 = 2(x - 3)$?

- A. -7
- B. -5
- C. -3
- D. -2

112. Which of the following could be used to solve the equation $-5x = 1$ for x in one step?

- A. Add -5 to both sides
- B. Divide both sides by -5
- C. Multiply both sides by -5
- D. Subtract -5 from both sides

113. Which equation has infinitely many solutions?

- A. $-5 + 6.2x = 6.2x - 6$
- B. $3x + 10.5 = 10.5 - 3x$
- C. $-2.5x - 8 = 8 - 2.5x$
- D. $-4x - 12 = -12 - 4x$

114. The lengths of the sides of a triangle are $2x + 5$, $x - 3$, and $3x + 1$. The perimeter of the triangle is 39 in. What are the lengths of the sides?
- A. 11 in., 3 in., and 7 in.
 - B. 15 in., 2 in., and 16 in.
 - C. 17 in., 3 in., and 19 in.
 - D. 19 in., 4 in., and 22 in.
115. What is the value of x in the equation $7 - \frac{3}{4}x = \frac{1}{2}x - 3$?
- A. 40
 - B. $\frac{25}{2}$
 - C. 8
 - D. $\frac{16}{5}$
116. What is the value of y in the equation $\frac{2}{3}(60y - 18) = \frac{1}{2}(8 - 16y)$?
- A. -4
 - B. $-\frac{1}{4}$
 - C. $\frac{1}{3}$
 - D. 3
117. Which of the following equations is equivalent to $2 - 3(5x + 2) = 6$?
- A. $-15x - 4 = 6$
 - B. $-15x + 4 = 6$
 - C. $-5x - 2 = 6$
 - D. $-5x + 2 = 6$

118. What value of x makes the equation $6x + 12 = 42$ true?

- A. 2
- B. 5
- C. 8
- D. 9

119. A telephone company charges a monthly fee of \$24 for 100 minutes of long distance service. The customer must then pay 7 cents per additional minute over 100. Todd's phone bill for October was \$26.38, not including taxes. How many total minutes of long distance did Todd use in October?

- A. 34
- B. 66
- C. 134
- D. 377

120. Which is the value of x in the equation below?

$$\frac{2x - 3}{10} = \frac{1}{2}x + \frac{3}{5}$$

- A. -3
- B. $-\frac{6}{5}$
- C. $\frac{6}{5}$
- D. 3

121. Which equation is equivalent to $7 + 3(x + 4) = 10$?

- A. $3x + 11 = 10$
- B. $3x + 19 = 10$
- C. $10x + 4 = 10$
- D. $10x + 40 = 10$

122. Emily is 4 years older than Grace. When their ages are added together, they equal 26. How old is Emily?

- A. 13 years old
- B. 15 years old
- C. 17 years old

123. Which equation is equivalent to $7 - (3x + 10) = 4(x - 2)$?

- A. $-3 - 3x = 4x - 8$
- B. $-3 - 3x = 4x - 2$
- C. $17 - 3x = 4x - 8$
- D. $17 - 3x = 4x - 2$

124. Which equation is equivalent to $-(4 - x) = 21$?

- A. $-4 + x = 21$
- B. $-4 + x = -21$
- C. $-4 - x = 21$
- D. $-4 - x = -21$

125. Which of the following would solve the equation below for x in one step?

$$10 = x - 15$$

- A. Adding 15 to both sides of the equation
- B. Adding 10 to both sides of the equation
- C. Subtracting 15 from both sides of the equation
- D. Subtracting 10 from both sides of the equation

126. Solve the given equation for x .

$$\frac{x}{9} + 3 = 11$$

- A. $\frac{8}{9}$
- B. $\frac{5}{3}$
- C. 72
- D. 96

127. Solve the given equation for x .

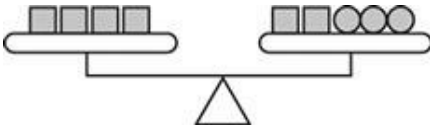
$$3x - 18 = 30$$

- A. 4
- B. 16
- C. 28
- D. 45

128. What is the value of n in the equation $\frac{60+n}{3} = \frac{84+n}{15}$?

- A. 96
- B. 64
- C. -36
- D. -54

129. Based on the balance scale below, what is the weight in kilograms of a square if a circle weighs 4 kilograms?



- A. 2
- B. 3
- C. 5
- D. 6

130. Which equation is equivalent to $6(y - 6) - (y + 2) = 26$?

- A. $5y - 4 = 26$
- B. $5y - 34 = 26$
- C. $5y - 38 = 26$
- D. $5y + 3 = 26$

131. Which equation is equivalent to $-6(y - 3) = 2(3x + 7)$?

- A. $-6y - 3 = 6x + 7$
- B. $-6y + 3 = 6x + 7$
- C. $-6y - 18 = 6x + 14$
- D. $-6y + 18 = 6x + 14$

132. What is the value of x in the equation $2(4 + 3x) + 6 = 32$?

- A. 3
- B. 6
- C. 7
- D. 8

133. A linear equation is shown below.

$$10w + 19 + 3w = 6(9 + w) - 14$$

Which statement is true?

- A. The equation has no solution.
- B. The solution to the equation is 3.
- C. The solutions to the equation are 3 and 7.
- D. The equation has infinitely many solutions.

134. What is the solution to $\frac{1}{3}(x - 7) = 2x + 3$?

- A. $-\frac{16}{5}$
- B. $-\frac{16}{7}$
- C. $\frac{2}{7}$
- D. $\frac{2}{5}$

135. What is the value of p in the equation $2(p - 5) = 2(10 + 2p)$?

- A. 15
- B. 5
- C. -5
- D. -15

136. Which equation below has infinitely many solutions?

- A. $\frac{1}{3}(6r + 12) = 2r + 12$
- B. $\frac{1}{4}(8r + 12) = 3 + 2r$
- C. $\frac{1}{2}(16 + 12r) = 12r + 8$
- D. $\frac{1}{5}(10r + 20) = 2r + 10$

137. What is the value of x in the equation $5(3x - 4) = 2x + 7 + 4x$?

- A. 1
- B. 3
- C. 6
- D. 13

138. What is the first step in solving for z in the equation $5z - 4 = 26$?

- A. Add 4 to both sides of the equation.
- B. Subtract 4 from both sides of the equation.
- C. Multiply both sides of the equation times 5.
- D. Divide both sides of the equation by 5.

139. Three times the difference of a number x and seven is twenty-three minus the sum of three times a number x and two. What is the value of x ?

- A. 5
- B. 7
- C. no solution
- D. infinitely many solutions

140. What value of x makes the equation true?

$$24 = -3(x - 2) + 3$$

- A. -11
- B. -5
- C. 5
- D. 11

141. Which statement best describes how the equation $3 - \frac{4}{5}x = 12$ can be solved for the value of x in two steps?

- A. Add $\frac{1}{3}$ to both sides of the equation, then multiply both sides by $-\frac{4}{5}$.
- B. Add 3 to both sides of the equation, then multiply both sides by $\frac{4}{5}$.
- C. Subtract $\frac{1}{3}$ from both sides of the equation, then multiply both sides by $-\frac{5}{4}$.
- D. Subtract 3 from both sides of the equation, then multiply both sides by $-\frac{5}{4}$.

142. What is the value of x in the equation below?

$$7 = 2x - 9$$

- A. -1
- B. 1
- C. 4
- D. 8

143. The steps Thomas used to solve an equation are shown.

Given: $10 - 2(x - 1) = 8$

Step 1: $8(x - 1) = 8$

Step 2: $x - 1 = 1$

Step 3: $x = 2$

Which statement about the steps Thomas used is true?

- A. There is an error in Step 1.
- B. There is an error in Step 2.
- C. There is an error in Step 3.
- D. Thomas's steps are all correct.

144. Which equation is equivalent to $3(2m + 7) = -5(6 + m)$?

- A. $6m + 7 = -30 + m$
- B. $6m + 7 = -30 - m$
- C. $6m + 21 = -30 + 5m$
- D. $6m + 21 = -30 - 5m$

145. A gym membership charges an initial fee of \$100 plus a \$25 fee every month. Another gym only charges \$45 every month. After how many months will the total cost for both gyms be the same?

- A. 2
- B. 3
- C. 4
- D. 5

146. Triangle GHI has the angle measures of $G = (2x + 5)^\circ$, $H = (6x - 10)^\circ$, and $I = (x + 5)^\circ$. What is the actual measurement of angle H ?

- A. 90°
- B. 105°
- C. 110°
- D. 125°

147. Which equation is equivalent to $4x + 2(3x - 2) = 10$?

- A. $6x = 10$
- B. $8x = 20$
- C. $10x - 4 = 10$
- D. $10x - 2 = 10$

148. Which of the following equations is equivalent to $2(5m + 4) = 7m - m$?

- A. $10m + 4 = 6m$
- B. $10m + 8 = 6m$
- C. $10m + 4 = 7$
- D. $10m + 8 = 7$

149. Which equation is equivalent to $-3(x + 2) = -7$?

- A. $(-3)x + 2 = -7$
- B. $(-3)x + (-3)2 = -7$
- C. $(-3)x + (-3 + 2) = -7$
- D. $(-3)x + (-3)2 = (-3)(-7)$

150. What is the solution to the equation $37x = 9x + 4$?

- A. -7
- B. $-\frac{1}{7}$
- C. $\frac{1}{7}$
- D. 7

151. Which equation is equivalent to $6(y + 3) - 3(y - 2) = 18$?

- A. $6y + 3 - 3y - 2 = 18$
- B. $6y + 3 + 3y - 2 = 18$
- C. $6y + 18 - 3y - 6 = 18$
- D. $6y + 18 - 3y + 6 = 18$

152. Three consecutive odd integers have a sum of 111. What is the smallest of the three integers?

- A. 33
- B. 35
- C. 37
- D. 39

153. Which equation is equivalent to $3(2x - 5) = 7(x + 2)$?

- A. $6x - 5 = 7x + 2$
- B. $6x + 5 = 7x + 2$
- C. $6x - 15 = 7x + 14$
- D. $6x + 15 = 7x + 14$

154. Which of the following describes how the value of x in the equation $85 = \frac{x+2}{5}$ could be found in two steps?

- A. Add 2 to both sides, then multiply both sides by 5.
- B. Divide both sides by 5, then subtract 2 from both sides.
- C. Subtract 2 from both sides, then multiply both sides by 5.
- D. Multiply both sides by 5, then subtract 2 from both sides.

155. A math contest has 25 multiple choice questions where right answers, wrong answers, and omitted answers are worth 6, 0, and 2.5 points, respectively. Therefore, a contestant's score, S , is given by the formula below, where a represents the number of answered questions and w represents the number of questions answered incorrectly.

$$S = 6(a - w) + 2.5(25 - a)$$

If a contestant answers 5 questions incorrectly, which is a correct formula for the contestant's score in terms of the number of questions answered?

- A. $S = 3.5a + 32.5$
- B. $S = 3.5a + 62.5$
- C. $S = 5a + 32.5$
- D. $S = 5a + 57.5$

156. Two hoses are used to fill a swimming pool. Together they fill the pool at a rate of 3 gallons every 5 seconds. An equation representing this is $g = \frac{3}{5}t$, where t is the time in seconds and g is the number of gallons. About how many hours will it take to fill the pool if it holds 80,000 gallons?

- A. 4
- B. 7
- C. 13
- D. 37

157. What value of x makes the equation $3x + 6 = 15$ true?

- A. 3
- B. 6
- C. 7
- D. 11

158. Which equation has the same solution as $(6 + 2x) - (3 - 4x) = 5$?

- A. $(6 - 3) + (2x - 4x) = 5$
- B. $(6 - 3) + (2x + 4x) = 5$
- C. $(6 + 3) + (2x - 4x) = 5$
- D. $(6 + 3) + (2x + 4x) = 5$

159. What is the solution to the equation $\frac{3}{5} - \frac{3}{5}\left(\frac{x}{2} - 3\right) = \frac{3}{2}\left(\frac{x}{5} - 1\right) - 3$?

A. $\frac{8}{3}$

B. 8

C. $\frac{23}{2}$

D. 14

160. What is the solution to the equation $8 - 7(4x - 2) = -28x + 6$?

A. 6

B. 12

C. no solution

D. all real numbers

161. Ricky is building a rectangular fence. Two sides of the fence have lengths of 28 feet each. Ricky only has 100 feet of fencing. What is the greatest length of each of the remaining two sides?

A. 22 feet

B. 44 feet

C. 56 feet

D. 72 feet

162. Which equation is equivalent to $(5 + 8x) + (-3x) = 7$?

A. $5 + (8x - 3x) = 7$

B. $5 + (8x + 3x) = 7$

C. $5 - (8x - 3x) = 7$

D. $5 - (8x + 3x) = 7$

163. Tia has a goldfish pond in her backyard. She has a white goldfish that is 11 inches long. This is 3 inches more than twice the length of her orange goldfish. This relationship can be represented by the equation, where x is the length of the orange goldfish, in inches.

$$2x + 3 = 11$$

What is the length of the orange goldfish?

- A. 2.2 inches
 - B. 2.5 inches
 - C. 4 inches
 - D. 7 inches
164. Which of the following equations is equivalent to $8(k + 11) - 6k = 19$?

- A. $2k + 11 = 19$
- B. $2k + 88 = 19$
- C. $14k + 11 = 19$
- D. $14k + 88 = 19$

165. Which equation is a simplified form of $3(x + 9) - (5x - 2) = 14$?

- A. $-2x + 29 = 14$
- B. $-2x + 11 = 14$
- C. $8x + 27 = 14$
- D. $8x + 29 = 14$

166. Solve for x .

$$10x - 3x + 5 = 26$$

- A. $\frac{13}{6}$
- B. 3
- C. $\frac{31}{7}$
- D. 13

167. Which equation is equivalent to $2 + 3(2x + 4) = 13$?

- A. $6x + 6 = 13$
- B. $6x + 14 = 13$
- C. $10x + 4 = 13$
- D. $10x + 20 = 13$

168. What is the value of x in the equation $\frac{x-4}{6} = \frac{3}{7}$?

A. $1\frac{3}{7}$

B. $3\frac{1}{7}$

C. $4\frac{1}{14}$

D. $6\frac{4}{7}$

169. Which equation has a solution equivalent to the solution to $4 + 3x + 1 = 23$?

A. $3x + 5 = 23$

B. $4 + 4x = 23$

C. $7x + 1 = 23$

D. $12x + 4 = 23$

170. Which equation is equivalent to $3 - (2x + 5) = 2(x - 3)$?

A. $8 - 2x = 2x - 6$

B. $8 - 2x = 2x - 3$

C. $-2 - 2x = 2x - 6$

D. $-2 - 2x = 2x - 3$

171. Which expression is equivalent to $13x - 2(3x + 6)$?

A. $-5x$

B. $7x - 12$

C. $7x + 12$

D. $19x + 12$

172. What is the value of x in the equation $\frac{3}{5}x - 2 = \frac{1}{3} + \frac{1}{4}x$?

A. $2\frac{1}{4}$

B. $3\frac{1}{3}$

C. $4\frac{3}{4}$

D. $6\frac{2}{3}$

173. What value of x satisfies the equation $3(x + 7) = -18$?

A. -1

B. -4

C. -8

D. -13

174. Which equation is equivalent to $3(5x - 4) = 2(7x)$?

A. $5x - 4 = 14x$

B. $5x - 12 = 14x$

C. $15x - 4 = 14x$

D. $15x - 12 = 14x$

175. What is the solution to the equation $\frac{x}{-15} = -5$?

A. 75

B. 20

C. -20

D. -75

176. Solve the given equation for x .

$$8 - \frac{6}{5}x = 10$$

A. $-3\frac{1}{5}$

B. $-\frac{5}{3}$

C. $\frac{5}{3}$

D. $3\frac{1}{5}$

177. Which equation is equivalent to $-(5 - x) = 5 - x$?

- A. $-5 - x = 5 - x$
- B. $-5 + x = 5 - x$
- C. $5 - x = 5 - x$
- D. $5 + x = 5 - x$

178. The sum of three consecutive integers is 87. What is largest value of the three integers?

- A. 28
- B. 29
- C. 30
- D. 31

179. Which operation will solve the equation below in one step?

$$c + 14 = -13$$

- A. add 14 to both sides
- B. add -13 to both sides
- C. subtract 14 from both sides
- D. subtract -13 from both sides

180. Lisa wants to apply the distributive property to the following equation:

$$\frac{4}{5}(x - 10) = 20$$

Which equation shows her next step?

- A. $\frac{4}{5}x + 8 = 20$
- B. $\frac{4}{5}x - 8 = 20$
- C. $\frac{4}{5}x + 10 = 20$
- D. $\frac{4}{5}x - 10 = 20$

181. Which operation should be performed on both sides of this equation to solve for x ?

$$x + 4 = 6$$

- A. add 4
- B. add the opposite of 4
- C. multiply by the reciprocal of 4
- D. multiply by the opposite reciprocal of 4

182. Enrique was asked to solve the equation $3(x + 2) = 12$. His steps are shown.

Step 1: $3(x + 2) = 12$

Step 2: $3x + 6 = 12$

Step 3: $3x = 6$

Step 4: $x = 3$

Which statement about his solution is correct?

- A. The problem is worked correctly at each step.
- B. In Step 2 the problem should be $3x + 2 = 12$.
- C. In Step 3 the problem should be $3x = 18$.
- D. In Step 4 the problem should be $x = 2$.

183. Which operation will solve the number sentence below in one step?

$$\frac{n}{5} = 16$$

- A. add 5 to both sides
- B. subtract 5 from both sides
- C. divide by 5 on both sides
- D. multiply by 5 on both sides

184. What is the solution to the equation?

$$4 - 2(m - 3) = -6m + 8$$

- A. $-\frac{5}{2}$
- B. $-\frac{1}{2}$
- C. $\frac{1}{2}$
- D. $\frac{5}{2}$

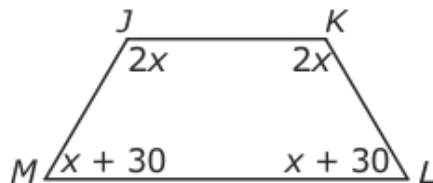
185. What is the value of x in the following equation?

$$320 = \frac{1}{5}(1,500 + x)$$

- A. 20
- B. 100
- C. 320
- D. 620

186. The relationship between the temperature in degrees Fahrenheit, F , and the temperature in degrees Celsius, C , is given by the formula $F = \frac{9}{5}C + 32$. If a body temperature is 98.6°F , which is closest to the body temperature in degrees Celsius?
- A. 23°C
 - B. 37°C
 - C. 120°C
 - D. 145°C

187. Trapezoid $JKLM$ is shown below.



What is the measure of angle J ?

- A. 50°
 - B. 80°
 - C. 100°
 - D. 140°
188. What is the value of x in the equation $\frac{2x - 12}{-3} = 7$?
- A. -1
 - B. $-4\frac{1}{2}$
 - C. -11
 - D. $-16\frac{1}{2}$
189. Which equation is equivalent to $3(2m + 7) = -5(6 + m)$?
- A. $6m + 7 = -30 + m$
 - B. $6m + 7 = -30 - m$
 - C. $6m + 21 = -30 + 5m$
 - D. $6m + 21 = -30 - 5m$

190. What is the value of x in the equation $0.25(3x - 4) - 0.5x = 2.75$?
- A. 27
 - B. 15
 - C. 7
 - D. 3
191. What value of x makes the equation $-4 + \frac{1}{2}x = 8$ true?
- A. 6
 - B. 8
 - C. 12
 - D. 24
192. Which of the following describes how the value of x can be found in the equation $\frac{x}{3} + 4 = \frac{1}{2}$ in two steps?
- A. Subtract 4 from both sides of the equation, and then multiply both sides of the equation by 3.
 - B. Subtract 4 from both sides of the equation, and then multiply both sides of the equation by $\frac{1}{3}$.
 - C. Add 4 to both sides of the equation, and then multiply both sides of the equation by 3.
 - D. Add 4 to both sides of the equation, and then multiply both sides of the equation by $\frac{1}{3}$.
193. Which equation is equivalent to $3(x + 2) - 5(x - 3) = 12$?
- A. $3x + 6 - 5x - 15 = 12$
 - B. $3x + 2 - 5x - 3 = 12$
 - C. $3x + 2 - 5x + 3 = 12$
 - D. $3x + 6 - 5x + 15 = 12$
194. What is the solution to the equation $5.2(2a - 1) = 7a + 14.6$, rounded to the nearest tenth?
- A. 4.6
 - B. 5.8
 - C. 10.2
 - D. 16.4

195. Two times a number plus one equals four times the same number minus five. What is the number?

A. -3

B. -1

C. 3

196.

197.

198.

199.

200.

201.

202.

203.

204.

205.

206.

207.

208.