

Released CST Algebra 1 Questions

1. Is the equation $3(2x - 4) = -18$ equivalent to $6x - 12 = -18$?

- a) Yes, the equations are equivalent by the Associative Property of Multiplication.
- b) Yes, the equations are equivalent by the commutative Property of Multiplication.
- c) Yes, the equations are equivalent by the Distributive Property of Multiplication.
- d) No, the equations are not equivalent.

2. Which statement is false?

- a) The order in which two whole numbers are subtracted does not affect the difference.
- b) The order in which two whole numbers are added does not affect the sum.
- c) The order in which two rational numbers are added does not affect the sum.
- d) The order in which two rational numbers are multiplied does not affect the sum.

3. $\sqrt{16} + \sqrt[3]{8} =$

- a) 4
- b) 6
- c) 9
- d) 10

4. Which expression is equivalent to x^6x^2 ?

- a) x^4x^3
- b) x^5x^3
- c) x^7x^3
- d) x^9x^3

5. Which number does *not* have a reciprocal?

- a) -1
- b) 0
- c) $\frac{1}{1000}$
- d) 3

6. What is the multiplicative inverse of $\frac{1}{2}$?

- a) -2
- b) -1/2
- c) 1/2
- d) 2

7. What is the solution for this equation?

$$|2x - 3| = 5$$

- a) $x = -4$ or $x = 4$
- b) $x = -4$ or $x = 3$
- c) $x = -1$ or $x = 4$
- d) $x = -1$ or $x = 3$

8. What is the solution set of the inequality $5 - |x + 4| \leq -3$?

- a) $-2 \leq x \leq 6$
- b) $x \leq -2$ or $x \geq 6$
- c) $-12 \leq x \leq 4$
- d) $x \leq -12$ or $x \geq 4$

9. Which equation is equivalent to $5x - 2(x + 1) = 14x$?

- a) $-9x - 2 = 14x$
- b) $-9x + 1 = 14x$
- c) $-9x + 2 = 14x$
- d) $12x - 1 = 14x$

10. Which equation is equivalent to $4(2 - 5x) = 6 - 3(1 - 3x)$?

- a) $8x = 5$
- b) $8x = 17$
- c) $29x = 5$
- d) $29x = 17$

11. Which equation is equivalent to $3[7x - 4(x - 3)] + 1 = 16$?

- a) $9x - 2 = 16$
- b) $9x + 37 = 16$
- c) $17x - 2 = 16$
- d) $17x + 13 = 16$

12. The total cost (c) in dollars of renting a sailboat for n days is given by the equation

$$c = 120 + 60n.$$

If the total cost was \$360, for how many days was the sailboat rented?

- a) 2
- b) 4
- c) 6
- d) 8

13. Solve: $3(x + 5) = 2x + 35$

Step 1: $3x + 15 = 2x + 35$

Step 2: $5x + 15 = 35$

Step 3: $5x = 20$

Step 4: $x = 4$

Which is the first *incorrect* step in the solution above?

- a) Step 1 b) Step 2 c) Step 3 d) Step 4

14. A 120-foot-long rope is cut into 3 pieces. The first piece of rope is twice as long as the second piece of rope. The third piece of rope is three times as long as the second piece of rope. What is the length of the longest piece of rope?

- a) 20 feet b) 40 feet c) 60 feet d) 80 feet

15. The cost to rent a construction crane is \$750 per day plus \$250 per hour of use. What is the maximum number of hours the crane can be used each day if the rental cost is not to exceed \$2500 per day?

- a) 2.5 b) 3.7 c) 7.0 d) 13.0

16. What is the solution to the inequality: $x - 5 > 14$?

- a) $x > 9$ b) $x > 19$ c) $x < 9$ d) $x < 19$

17. The lengths of the sides of a triangle are y , $y + 1$, and 7 centimeters. If the perimeter is 56 centimeters, what is the value of y ?

- a) 24 b) 25 c) 31 d) 32

18. Beth is two years older than Julio. Gerald is twice as old as Beth. Debra is twice as old as Gerald. The sum of their ages is 38. How old is Beth?

- a) 3 b) 5 c) 6 d) 8

19. Which number serves as a counterexample to the statement below?

All positive integers are divisible by 2 or 3.

- a) 100 b) 57 c) 30 d) 25

20. What is the conclusion of the statement below?

If $x^2 = 4$, then $x = -2$ or $x = 2$.

- a) $x^2 = 4$ b) $x = -2$ c) $x = 2$ d) $x = -2$ or $x = 2$

21. Which of the following is a valid conclusion to the statement "If a student is a high school band member, then the student is a good musician"?

- a) All good musicians are high school band members.
b) A student is a high school band member.
c) All students are good musicians.
d) All high school band members are good musicians.

22. The chart below shows an expression evaluated for four different values of x .

x	$x^2 + x + 5$
1	7
2	11
6	47
7	61

Josiah concluded that for all positive values of x , $x^2 + x + 5$ produces a prime number. Which value of x serves as a counterexample to prove Josiah's conclusion false?

- a) 5 b) 11 c) 16 d) 21

23. John's solution to an equation is shown below.

Given: $x^2 + 5x + 6 = 0$

Step 1: $(x + 2)(x + 3) = 0$

Step 2: $x + 2 = 0$ or $x + 3 = 0$

Step 3: $x = -2$ or $x = -3$

Which property of real numbers did John use for **Step 2**?

- a) multiplication property of equality
b) zero property of multiplication
c) commutative property of multiplication
d) distributive property of multiplication over addition

24. Stan's solution to an equation is shown below.

Given: $n + 8(n + 20) = 110$

Step 1: $n + 8n + 20 = 110$

Step 2: $9n + 20 = 110$

Step 3: $9n = 110 - 20$

Step 4: $9n = 90$

Step 5: $\frac{9n}{9} = \frac{90}{9}$

Step 6: $n = 10$

Which statement about Stan's solution is true?

- a) Stan's solution is correct.
- b) Stan made a mistake in Step 1.
- c) Stan made a mistake in Step 3.
- d) Stan made a mistake in Step 5.

25. When is this statement true? **The opposite of a number is less than the original number.**

- a) This statement is never true.
- b) This statement is always true.
- c) This statement is true for positive numbers.
- d) This statement is true for negative numbers.

26. What is the y-intercept of the graph of $4x + 2y = 12$?

- a) -4
- b) -2
- c) 6
- d) 12

27. What is the x-intercept of the line defined by $-2x + 3y = 12$?

- a) 6
- b) 4
- c) -4
- d) -6

28. Which point lies on the line defined by $3x + 6y = 2$?

- a) (0,2)
- b) (0,6)
- c) $(1, -\frac{1}{6})$
- d) $(1, -\frac{1}{3})$

29. What is the equation of the line that has a slope of 4 and passes through the point (3, -10)?

- a) $y = 4x - 22$
- b) $y = 4x + 22$
- c) $y = 4x - 43$
- d) $y = 4x + 43$

30. The data in the table show the cost of renting a bicycle by the hour, including a deposit.

Renting a Bicycle

Hours (h)	Cost in dollars (c)
2	15
5	30
8	45

If hours, h , were graphed on the horizontal axis and cost, c , were graphed on the vertical axis, what would be the equation of a line that fits the data?

- a) $c = 5h$
- b) $c = \frac{1}{5}h + 5$
- c) $c = 5h + 5$
- d) $c = 5h - 5$

31. Some ordered pairs for a linear function of x are given in the table below.

x	y
1	1
3	7
5	13
7	19

Which of the following equations was used to generate the table above?

- a) $y = 2x + 1$
- b) $y = 2x - 1$
- c) $y = 3x - 2$
- d) $y = 4x - 3$

32. Which point lies on the line represented by the equation below?

$$5x + 4y = 22$$

- a) $(-2, \frac{11}{4})$
- b) $(-1, \frac{17}{4})$
- c) (2,3)
- d) (6,2)

33. The equation of line l is $6x + 5y = 3$ and the equation of line q is $5x - 6y = 0$. Which statement about the two lines is true?

- a) Lines l and q have the same y-intercept.
- b) Lines l and q are parallel.
- c) Lines l and q have the same x-intercept.
- d) Lines l and q are perpendicular.

34. Which equation represents a line that is parallel to $y = -\frac{5}{4}x + 2$?

- a) $y = -\frac{5}{4}x + 1$
- b) $y = -\frac{4}{5}x + 2$
- c) $y = \frac{4}{5}x + 3$
- d) $y = \frac{5}{4}x + 4$

35. What is the solution to this system of equations?

$$y = -3x - 2$$

$$6x + 2y = -4$$

- a) (6, 2)
- b) (1, -5)
- c) no solution
- d) infinitely many solutions

36. Which ordered pair is the solution to the system of equations below?

$$x + 3y = 7$$

$$x + 2y = 10$$

- a) $\left(\frac{7}{2}, \frac{13}{4}\right)$
- b) $\left(\frac{7}{2}, \frac{17}{5}\right)$
- c) (-2, 3)
- d) (16, -3)

37. Marcy has a total of 100 dimes and quarters. If the total value of the coins is \$14.05, how many quarters does she have?

- a) 27
- b) 40
- c) 56
- d) 73

38. Which of the following best describes the graph of this system of equations?

$$y = -2x + 3$$

$$5y = -10x + 15$$

- a) two identical lines
- b) two parallel lines
- c) two lines intersecting in only one point
- d) two lines intersecting in only two points

39. Members of the senior class held a car wash to raise funds for their senior prom. They charged \$3 to wash a car and \$5 to wash a pick-up truck or a sport utility vehicle. If they earned a total of \$275 by washing a total of 75 vehicles, how many cars did they wash?

- a) 25
- b) 34
- c) 45
- d) 50

40. At what point do the lines represented by the equations $2x + y + 1 = 0$ and $4x + y - 3 = 0$ intersect?

- a) (2, 5)
- b) (2, -5)
- c) (-1, 1)
- d) (1, -1)

41. $\frac{5x^3}{10x^7} =$

- a) $2x^4$
- b) $\frac{1}{2x^4}$
- c) $\frac{1}{5x^4}$
- d) $\frac{x^4}{5}$

42. $(4x^2 - 2x + 8) - (x^2 + 3x - 2) =$

- a) $3x^2 + x + 6$
- b) $3x^2 + x + 10$
- c) $3x^2 - 5x + 6$
- d) $3x^2 - 5x + 10$

43. The sum of two binomials is $5x^2 - 6x$. If one of the binomials is $3x^2 - 2x$, what is the other binomial?

- a) $2x^2 - 4x$
- b) $2x^2 - 8x$
- c) $8x^2 + 4x$
- d) $8x^2 - 8x$

44. Which of the following expressions is equal to $(x + 2) + (x - 2)(2x + 1)$?

- a) $2x^2 - 2x$
- b) $2x^2 - 4x$
- c) $2x^2 + x$
- d) $4x^2 + 2x$

45. A volleyball court is shaped like a rectangle. It has a width of x meters and a length of $2x$ meters. Which expression gives the area of the court in square meters?

- a) $3x$
- b) $2x^2$
- c) $3x^2$
- d) $2x^3$

46. Which is the factored form of $3a^2 - 24ab + 48b^2$?

- a) $(3a - 8b)(a - 6b)$ b) $(3a - 16b)(a - 3b)$ c) $3(a - 4b)(a - 4b)$ d) $3(a - 8b)(a - 8b)$

47. Which is a factor of $x^2 - 11x + 24$?

- a) $x + 3$ b) $x - 3$ c) $x + 4$ d) $x - 4$

48. Which of the following shows $(3t + 4)(3t + 1)$ factored completely?

- a) $(3t + 2)^2$ b) $(3t + 4)(3t + 1)$ c) $(9t + 4)(t + 1)$ d) $(3t + 4)(3t + 1)$

49. What is the complete factorization of $32 - 8z^2$?

- a) $-8(2 + z)(2 - z)$ b) $8(2 + z)(2 - z)$ c) $8(2 + z)^2$ d) $8(2 - z)^2$

50. If x^2 is added to x , the sum is 42. Which of the following could be the value of x ?

- a) -7 b) -6 c) 14 d) 42

51. What quantity should be added to both sides of this equation to complete the square?

$$x^2 - 8x = 5$$

- a) 4 b) -4 c) 16 d) -16

52. What are the solutions for the quadratic equation $x^2 + 6x = 16$?

- a) -2, -8 b) -2, 8 c) 2, -8 d) 2, 8

53. Leanne correctly solved the equation $x^2 + 4x = 6$ by completing the square. Which equation is part of her solution?

- a) $(x + 2)^2 = 8$ b) $(x + 2)^2 = 10$ c) $(x + 4)^2 = 10$ d) $(x + 4)^2 = 22$

54. Carter is solving this equation by factoring.

$$10x^2 - 25x + 15 = 0$$

Which expression could be one of his correct factors?

- a) $x + 3$ b) $x - 3$ c) $2x + 3$ d) $2x - 3$

55. What are the solutions for the quadratic equation $x^2 - 8x = 9$?

- a) 3 b) 3, -3 c) 1, -9 d) -1, 9

56. Toni is solving this equation by completing the square.

$$ax^2 + bx + c = 0$$

Step 1: $ax^2 + bx = -c$

Step 2: $x^2 + \frac{b}{a}x = -\frac{c}{a}$

Step 3: ?

Which should be **Step 3** in the solution?

- a) $x^2 = -\frac{c}{b} - \frac{b}{a}x$ b) $x + \frac{b}{a} = -\frac{c}{ax}$ c) $x^2 + \frac{b}{a}x + \frac{b}{2a} = -\frac{c}{a} + \frac{b}{2a}$
d) $x^2 + \frac{b}{a}x + \frac{b}{2a} = -\frac{c}{a} + \frac{b}{2a}$

57. Which is one of the solutions to the equation $2x^2 - x - 4 = 0$?

- a) $\frac{1}{4} - \sqrt{33}$ b) $-\frac{1}{4} + \sqrt{33}$ c) $\frac{1 + \sqrt{33}}{4}$ d) $\frac{-1 - \sqrt{33}}{4}$

58. Which statement best explains why there is no real solution to the quadratic equation $2x^2 + x + 7 = 0$?

- a) The value of $1^2 - 4 \cdot 2 \cdot 7$ is positive.
b) The value of $1^2 - 4 \cdot 2 \cdot 7$ is equal to 0.
c) The value of $1^2 - 4 \cdot 2 \cdot 7$ is negative.
d) The value of $1^2 - 4 \cdot 2 \cdot 7$ is not a perfect square.

59. What is the solution set of the quadratic equation $8x^2 + 2x + 1 = 0$?

- a) $\left\{-\frac{1}{2}, \frac{1}{4}\right\}$ b) $\{-1 + \sqrt{2}, -1 + \sqrt{2}\}$ c) $\left\{\frac{-1 + \sqrt{7}}{8}, \frac{-1 - \sqrt{7}}{8}\right\}$ d) no real solution

60. What are the solutions to the equation $3x^2 + 3 = 7x$?

- a) $x = \frac{7 + \sqrt{85}}{6}$ or $x = \frac{7 - \sqrt{85}}{6}$ b) $x = \frac{-7 + \sqrt{85}}{6}$ or $x = \frac{-7 - \sqrt{85}}{6}$
c) $x = \frac{7 - \sqrt{13}}{6}$ or $x = \frac{7 + \sqrt{13}}{6}$ d) $x = \frac{-7 + \sqrt{13}}{6}$ or $x = \frac{-7 - \sqrt{13}}{6}$

61. Which quadratic function, when graphed, has x -intercepts of 4 and -3?

- a) $y = (x - 3)(x + 4)$ b) $y = (x + 3)(2x - 8)$ c) $y = (3x - 1)(4x + 1)$
d) $y = (3x + 1)(8x - 2)$

62. How many times does the graph of $y = 2x^2 - 2x + 3$ intersect the x -axis?

- a) none b) one c) two d) three

63. What is $\frac{x^2 - 4xy + 4y^2}{3xy - 6y^2}$ reduced to lowest terms?

- a) $\frac{x - 2y}{3}$ b) $\frac{x - 2y}{3y}$ c) $\frac{x + 2y}{3}$ d) $\frac{x + 2y}{3y}$

64. Simplify $\frac{6x^2 + 21x + 9}{4x^2 - 1}$ to lowest terms.

- a) $\frac{3(x+1)}{2x-1}$ b) $\frac{3(x+3)}{2x-1}$ c) $\frac{3(2x+3)}{4(x-1)}$ d) $\frac{3(x+3)}{2x+1}$

65. What is $\frac{x^2 - 4x + 4}{x^2 - 3x + 2}$ reduced to lowest terms?

- a) $\frac{x - 2}{x - 1}$ b) $\frac{x - 2}{x + 1}$ c) $\frac{x + 2}{x - 1}$ d) $\frac{x + 2}{x + 1}$

66. What is $\frac{12a^3 - 20a^2}{16a^2 + 8a}$ reduced to lowest terms?

- a) $\frac{a}{2}$ b) $\frac{3a - 5}{2a + 1}$ c) $-\frac{2a}{4 + 2a}$ d) $\frac{a(3a - 5)}{2(2a + 1)}$

67. What is the simplest form of the fraction $\frac{x^2 - 1}{x^2 + x - 2}$?

- a) $\frac{-1}{x - 2}$ b) $\frac{x - 1}{x - 2}$ c) $\frac{x - 1}{x + 2}$ d) $\frac{x + 1}{x + 2}$

68. $\frac{7z^2 + 7z}{4z + 8} \cdot \frac{z^2 - 4}{z^3 + 2z^2 + z} =$

- a) $\frac{7(z - 2)}{4(z + 1)}$ b) $\frac{7(z + 2)}{4(z - 1)}$ c) $\frac{7z(z + 1)}{4(z + 2)}$ d) $\frac{7z(z - 1)}{4(z + 2)}$

69. Which fraction equals the product $\left(\frac{x + 5}{3x + 2}\right)\left(\frac{2x - 3}{x - 5}\right)$?

- a) $\frac{2x - 3}{3x + 2}$ b) $\frac{3x + 2}{4x - 3}$ c) $\frac{x^2 - 25}{6x^2 - 5x - 6}$ d) $\frac{2x^2 + 7x - 15}{3x^2 - 13x - 10}$

70. $\frac{x^2 + 8x + 16}{x + 3} \div \frac{2x + 8}{x^2 - 9} =$

$$a) \frac{2(x+4)^2}{(x-3)(x+3)^2}$$

$$b) \frac{2(x+3)(x-3)}{x+4}$$

$$c) \frac{(x+4)(x-3)}{2}$$

$$d) \frac{(x+4)(x-3)^2}{2(x+3)}$$

71.

Jena's Vacation

Miles Traveled	600	450	300	960
Gallons of Gasoline	20	15	10	x

Jena's car averaged 30 miles per gallon of gasoline on her trip. What is the value of x in gallons of gasoline?

- a) 32 b) 41 c) 55 d) 80

72. Which relation is a function?

- a) $\{(-1,3),(-2,6)(0,0),(-2,-2)\}$ b) $\{(-2,-2),(1,1)(0,0),(2,2)\}$
 c) $\{(4,0),(4,1)(4,2),(4,3)\}$ d) $\{(7,4),(8,8)(10,8),(10,10)\}$

73. Which relation is a function?

a)

Input	Output
1	2
2	2
3	3
4	3

b)

Input	Output
2	6
2	5
6	4
6	3

c)

Input	Output
1	2
2	4
4	6
4	8

d)

Input	Output
0	1
0	2
1	3
1	4

74. Andy's average driving speed for a 4-hour trip was miles per hour. During the first 3 hours he drove 40 miles per hour. What was his average speed for the last hour of his trip?

- a) 50 miles per hour b) 60 miles per hour c) 65 miles per hour
 d) 70 miles per hour

75. One pipe can fill a tank in 20 minutes, while another takes 30 minutes to fill the same tank. How long would it take the two pipes together to fill the tank?

- a) 50 min b) 25 min c) 15 min d) 12 min

76. Two airplanes left the same airport traveling in opposite directions. If one plane averages 400 miles per hour and the other airplane averages 250 miles per hour, in how many hours will the distance between the two planes be 1625 miles?

- a) 2.5 b) 4 c) 5 d) 10.8