

Algebra I

1. A truck and a car are driving toward each other on a two-way road. If the truck is moving at 60 mph and the car is moving at 70 mph, how long will it take for the truck and the car to pass each other if they start with 58.5 miles between them?
 - a. 18 hours and 51 minutes
 - b. 27 minutes
 - c. 45 minutes
 - d. 1 hour and 49 minutes
 - e. NOTA

2. The number of apples on a tree can be expressed with the function $A(t) = -8t + 512$ where $A(t)$ represents the number of apples left on a tree after t months. What does the value 512 represent in the given function?
 - a. The rate at which apples fall from the tree
 - b. The total number of apples on the ground at the beginning
 - c. The number of apples on the tree at the beginning
 - d. The number of months for the apple tree to run out of apples
 - e. NOTA

3. A tub holds 80 gallons of water. If the water is drained at 6 gallons per minute, which of the following equations expresses the gallons of water, $G(t)$, in the tub after t seconds?
 - a. $G(t) = 80 + 6t$
 - b. $G(t) = 80 - 6t$
 - c. $G(t) = 80 - .1t$
 - d. $G(t) = 80 + .1t$
 - e. NOTA

4. Which of the following is equivalent to $\sqrt{x^2}$?
 - a. x
 - b. $\pm x$
 - c. $|x|$
 - d. $\sqrt{x^2}$
 - e. *NOTA*

5. Which of the following functions has the domain $[0, \infty)$?
 - a. $f(x) = \sqrt{3x + 7}$
 - b. $f(x) = 4x + 3$
 - c. $f(x) = \ln \ln x$
 - d. $f(x) = 4\sqrt{x}$

e. NOTA

6. What is the value of the function $f(x) = \begin{cases} x+4, & x \leq 0 \\ x^4, & 0 \leq x < 4 \\ \sqrt{9x^3}, & x \geq 4 \end{cases}$ at $x=4$?

a. 24

b. 256

c. 0

d. $8\sqrt{3}$

e. NOTA

7. Which of the following is the solution to the inequality $-4|x| \geq 16$?

a. $x \geq -4$

b. $x \leq -4$

c. $x \in \mathbb{R}$

d. $4 \leq x \leq 4$

e. NOTA

8. Which of the following is a solution to the inequality $|x - 4| < 4$?

a. $x = 0$

b. $x = 2$

c. $x = 8$

d. $x = 10$

e. NOTA

9. Simplify $\sqrt[3]{16x^8y^6}$

a. $x^2y^2\sqrt[3]{16x^2}$

b. $4x^4y^3$

c. $x^5y^3\sqrt[3]{16}$

d. $x^3y^3\sqrt[3]{16x^5y^3}$

e. NOTA

10. What is the value of x in the equation $\frac{1}{(x+4)(x-2)} = \frac{1}{x+4} + \frac{1}{x+2}$

a. $-\frac{1}{2}$

b. 0

c. $\pm \frac{3\sqrt{17}}{4} - \frac{3}{4}$

d. $-\frac{5}{2}$

e. NOTA

11. Which of the following are real roots of the function $f(x) = x^4 - 64$?

- I. 0
- II. 4
- III. -4
- IV. $\sqrt{-8}$

- a. I and II
- b. IV
- c. II, III, and IV
- d. All are correct
- e. NOTA

12. Where do the functions $f(x)$ and $g(x)$ intersect where $f(x) = |x - 2| + 3$ and $g(x) = x^2 + 4x + 9$?

- I. $(-4, 9)$
- II. $(-1, 6)$
- III. $(-2, 5)$

- a. I
- b. I and II
- c. I and III
- d. II and III
- e. NOTA

13. What is the ordinate of the vertex of the parabola expressed by the function $f(x) = \frac{1}{3}x^2 + 4x + 6$?

- a. $-3(2 \pm \sqrt{2})$
- b. 0
- c. -6
- d. $6\sqrt{2}$
- e. NOTA

14. What is the sum of the prime numbers in the prime factorization of 2019?

- a. 2020
- b. 676
- c. 2696
- d. 677
- e. NOTA

15. What is the value of the expression $\frac{x^7 y^3}{y^{13} x^{15}}$

- a. $\sqrt[45]{x^{-26} y^{39}}$
- b. $\sqrt[45]{x^{136} y^{40}}$

- c. $\sqrt[117]{x^{136}y^{15}}\sqrt{y^{22}}$
- d. $\sqrt[45]{x^{26}y^{39}}\sqrt[80]{y}$
- e. NOTA

16. What is the area bounded by the function $f(x) = |x|$, $f(x) = 0$, and $x = 7$?

- a. 49
- b. 0
- c. $\frac{49}{2}$
- d. 7
- e. NOTA

17. Given the geometric sequence $u_n = 5 \times \frac{1}{7}^{n-1}$ where u_n represents the value of the nth term, what is the sum of the first three numbers in the sequence?

- a. 0
- b. 5
- c. $\frac{15}{49}$
- d. $\frac{286}{49}$
- e. NOTA

18. What is the coordinate pair which satisfies the following system of linear equations?

$$\frac{4}{3}x + \frac{5}{3}y = 13$$

$$\frac{6}{5}x + \frac{4}{3}y = 2$$

- a. $(-63, \frac{723}{20})$
- b. $(\frac{291}{5}, -63)$
- c. $(\frac{723}{20}, -63)$
- d. $(-63, \frac{291}{5})$
- e. NOTA

19. A shirt is on sale for 30% off its original price. If its original price was \$35 and there is a 2% tax after the discount has been applied, what is the total cost of the shirt after tax?

- a. \$10.29
- b. \$10.71
- c. \$19.11
- d. \$19.89
- e. NOTA

20. What is the equation of the line that is perpendicular to the line $y = \frac{4}{3}x + 3$ and passes through $(-1, 3)$?

- a. $\frac{4}{3}(y - 3) = -(x + 1)$
- b. $x - 3 = -\frac{3}{4}(y + 1)$
- c. $x + 1 = -\frac{3}{4}(y - 3)$
- d. $y - 3 = \frac{4}{3}(x + 1)$
- e. NOTA

21. Simplify the following expression: $\frac{4x+12}{(x+3)^2} \div \frac{x^2+7x+12}{4(x+4)}$

- a. $\frac{1}{x+3}$
- b. 1
- c. $\frac{16}{(x+3)^2}$
- d. $\frac{4(x+4)}{x+3}$
- e. NOTA

22. Which of the following do NOT have the same slope as the line $-5x - 3y = \frac{7}{2}$?

- a. $-y - 5 = \frac{3}{5}\left(x - \frac{1}{2}\right)$
- b. $\frac{1}{2}y - \frac{5}{6}x = \frac{1}{3}$
- c. $y = -\frac{3}{5}x + \frac{7}{2}$
- d. A line perpendicular to the line $y = -\frac{4}{3}x + \frac{2}{7}$
- e. NOTA

23. A container has a maximum capacity of 5 gallons and is $\frac{1}{3}$ of the way full. If this container were to be poured into cups, how many cups would be completely filled? (Hint: 1 gallon = 16 cups)

- a. 3 cups
- b. 5 cups
- c. 26 cups
- d. 27 cups
- e. NOTA

24. If $f(\Delta) = 3\Delta^2$, what is the value of $f(x+2)$?

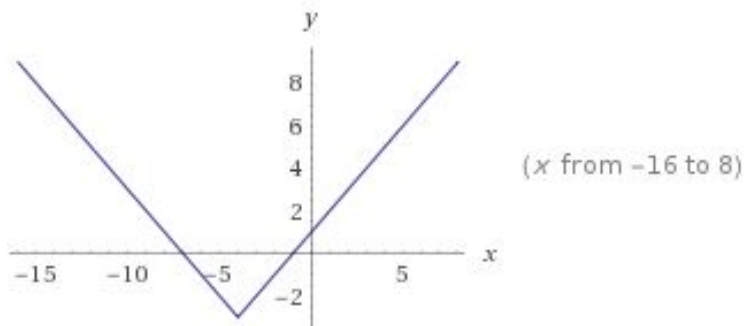
- a. $(3x + 6)^2$
- b. $x^2 + 4x + 4$
- c. $3x^2 + 12x + 12$
- d. $3\Delta + 2$
- e. NOTA

25. Which of the following equations represent the following graph?



- a. $|x| \leq 3$
- b. $|x| \geq 3$
- c. $|x| < 3$
- d. $|x| > 3$
- e. NOTA

26. Which of the following equations represent the following graph?



- a. $y = |x + 4| - 3$
- b. $y = |x - 4| - 3$
- c. $|y + 3| = x + 4$
- d. $|y + 3| = x - 4$
- e. NOTA

27. What is the sum of the zeroes of the following function?

$$f(x) = 4x^2 + 3x - 32$$

- a. 0
- b. $\frac{-3 \pm \sqrt{521}}{8}$
- c. -6
- d. $-\frac{4}{3}$
- e. NOTA

28. Solve the following equation for x in terms of y:

$$4x + 6xy = 24xy^2 + 7$$

- a. $x = 0$
- b. $x = \frac{-7}{2(12y^2 - 3y - 2)}$

c. $x = \frac{24xy^2 - 6xy + 7}{4}$

d. $x = \frac{7}{24y^2 - 6y - 4}$

e. NOTA

29. What is the value of $\frac{2019!}{2018!}$?

a. $2018! + 2019$

b. $2019^{2019/(2018! \times 2019)}$

c. $\frac{2019}{2018}$

d. 2019^0

e. NOTA

30. What is the length of the hypotenuse of a right triangle if the length of its two legs are 15 and 20?

a. 5

b. 35

c. $\frac{35}{2}$

d. 25

e. NOTA

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