Algebra I 2017

1. Solve $2+3y=4x-xy$ for y.

[a] $y=\dfrac{4x-2}{x+3}$ [b] $y=\dfrac{3x+2}{4-x}$ [c] $y=\dfrac{4x-1}{x}$ [d] None of the Above

2. Write the slope-intercept form of an equation for the line that passes through $(1,4)$ and perpendicular to the line $x-6y=2$.

[a] $y=6x-2$ [b] $y=-6x+10$ [c] $y=\dfrac{1}{6}x+\dfrac{23}{6}$ [d] None of the Above

3. Given two numbers n_1 and n_2 such that n_1 is three more than twice the other number. The sum of the two numbers is 33. Find n_1 and n_2.

[a] $n_1=30, n_2=3$ [b] $n_1=23, n_2=10$ [c] $n_1=21\ n_2=12$ [d] None of the above

4. Factor the trinomial $x^2-9x+20$.

[a] $(x-5)(x+4)$ [b] $(x+5)(x-4)$ [c] $(x-5)(x-4)$ [d] None of the above

5. Find the product of $(4-\sqrt{11})(4+\sqrt{11})$.

[a] 5 [b] $16-\sqrt{11}$ [c] 11 [d] None of the above

6. Find the sum of $\dfrac{-4}{a+3}+\dfrac{-12}{a^2+3a}$.

[a] $\dfrac{-4}{a}$ [b] $\dfrac{-16}{a^2+2a}$ [c] $\dfrac{-16}{a^2+4a+3}$ [d] None of the above

7. If the length of a rectangle is 2 less than 3 times the width, then find the perimeter of the rectangle when the width is 9 inches.

[a] 34 inches [b] 225 inches [c] 68 inches [d] None of the above

8. Simplify the expression $\left(\dfrac{12a^4b^8}{21a^5b^4}\right)^{-2}$.

[a] $\dfrac{16b^8}{49a^2}$ [b] $\dfrac{49b^8}{16a^2}$ [c] $\dfrac{49a^8}{16b^2}$ [d] None of the Above

9. How many 9-inch ribbons can be cut from $9\frac{3}{4}$ yards of ribbon?

[a] 13 [b] 39 [c] 104 [d] None of the Above

10. Joe earns a 7.5% commission on his weekly sales at a store. Last week he had $3,600 in sales. What was his commission for the week?

[a] $270 [b] $333 [c] $396 [d] None of the Above

11. Solve $|2x - 4| - 3 = 9$ for x.

[a] $x = -5, 2$ [b] $x = 8, -4$ [c] $x = -6, 6$ [d] None of the above

12. The scale factor for two similar triangles is 4:5. The perimeter of the smaller triangle is 60 cm. What is the perimeter of the larger triangle?

[a] 75 cm [b] 48 cm [c] 96 cm [d] None of the above

13. A hang glider 37 meters above the ground starts to descend at a constant rate of 3 meters per second. Which equation could be used to determine h, the hang glider's height after t seconds of descent?

[a] $h = -37t + 3$ [b] $h = 3t + 37$ [c] $h = 3t - 37$ [d] None of the above

14. The number of students at Octothorpe Academy increased from 760 to 830 over a 5-year period. What was the percent of increase?

[a] 46.1% [b] 8.4% [c] 9.2% [d] None of the above

15. What is the base of the triangle if the height is 9 feet and the area is 72 square feet?

[a] 4 feet [b] 8 feet [c] 16 feet [d] None of the above

16. Suppose that a car rental service charges $50 per day plus 20 cents per mile for car rentals. How much does it cost to rent a car to drive 150 miles in 2 days?

[a] $130.00 [b] $80.00 [c] $74.40 [d] None of the Above

17. Solve for a. $ab + c = \frac{b}{c}$

[a] $a = \frac{1}{c} - \frac{c}{b}$ [b] $a = c - \frac{c}{b}$ [c] $a = \frac{b}{c} - c$ [d] None of the Above

18. Solve $2x^2 + 3x - 7 = -4$ for x.

[a] $x = \frac{-3}{4}, \frac{-3}{2}$ [b] $x = \frac{-3+\sqrt{11}}{4}, \frac{-3-\sqrt{11}}{4}$ [c] $x = \frac{-3+\sqrt{33}}{4}, \frac{-3-\sqrt{33}}{4}$ [d] None of the Above

19. Suppose that a fridge costs $972 after the dealer adds a 15% markup. How much did the dealer pay for the fridge?

[a] $1117.80 [b] $800.00 [c] $845.22 [d] None of the Above

20. A field is 10 feet longer than it is wide and the perimeter of the field is 400 feet. What is the width of the field?

[a] 95 feet [b] 105 feet [c] 100 feet [d] None of the Above

21. Solve the inequality $2 + |x - 4| < 9$ for x and write the answer in interval notation.

[a] (-3, 11) [b] (11, -3) [c] $(-\infty, 11)$ [d] None of the Above

22. Simplify the following expression $2(3x^2y^3)(9x^3y^5)$.

[a] $54x^6y^{15}$ [b] $27x^5y^8$ [c] $54x^5y^8$ [d] None of the Above

23. Given the function $f(x) = \frac{3}{4}x^2 + 2^x$. Compute $f(2)$.

[a] 11 [b] 7 [c] $\frac{33}{4}$ [d] None of the Above

24. Simplify the following expression $4\sqrt{50} + 3\sqrt{18}$.

[a] $29\sqrt{2}$ [b] $7\sqrt{2}$ [c] $30\sqrt{3}$ [d] None of the Above

25. A path runs diagonally through a rectangular park that is 10 kilometers long and 5 kilometers wide. How long is the path?

[a] 12 km [b] 15 km [c] $10\sqrt{5}$ km [d] None of the Above

26. Suppose that 12% of 7500 people polled said vanilla was their favorite flavor of ice cream. How many people had a favorite flavor other than vanilla?

[a] 900 [b] 6600 [c] 5400 [d] None of the Above

27. 3 times a number is 7 less than 40. Find the number.

[a] 11 [b] 33 [c] 7 [d] None of the Above

28. Simplify the following expression $\frac{3x^2+2}{yx^2} - \frac{y+3x}{yx}$.

[a] $\frac{6x^2-xy+2}{yx^2}$ [b] $\frac{y^2x+2}{xy}$ [c] $\frac{2-xy}{yx^2}$ [d] None of the Above

29. Find the midpoint of (5, 4) and (-5, -4).

[a] (0, 0) [b] (2.5, 2) [c] (-2.5, -2) [d] None of the Above

30. Solve $\sqrt{x^2 - 12} = 2$ for x.

[a] $x = \sqrt{14}, -\sqrt{14}$ [b] $x = 4, -4$ [c] $x = 2, 5$ [d] None of the Above

31. Suppose your car gets 20 mpg and a gallon of gas costs $2. How much does it cost you to drive 500 miles?

[a] $50 [b] $35 [c] $69.50 [d] None of the Above

32. Solve the inequality $7 - 5x \leq 22$ and give the answer in interval notation.

[a] $[-3, \infty)$ [b] $(-\infty, -3]$ [c] $(-3, \infty)$ [d] None of the above

33. Simplify the following fraction $\frac{x+2}{\left(x - \frac{x}{x+3}\right)}$.

[a] $\frac{(x+2)(x+3)}{3}$ [b] $\frac{x+3}{x}$ [c] $\frac{x+2}{x}$ [d] None of the above

34. Perform the operation and simplify: $\dfrac{x^2+x}{x^2-4} \div \dfrac{x^2-1}{x^2+5x+6}$.

[a] $\dfrac{x(x+2)}{(x-1)(x-4)}$ [b] $\dfrac{x(x+6)}{(x+2)(x-2)}$ [c] $\dfrac{x(x+3)}{(x-1)(x-2)}$ [d] None of the above

35. Solve the absolute value inequality for *x*, $|4x+7| > 5$. Express the solution in interval notation.

[a] $\left(-3, \dfrac{-1}{2}\right)$ [b] $(-\infty, -3)$ [c] $\left(\dfrac{-1}{2}, \infty\right)$ [d] None of the above

36. Rationalize the denominator of this expression $\sqrt{\dfrac{x^7}{75}}$.

[a] $\dfrac{x^3\sqrt{3}}{15}$ [b] $\dfrac{x^3\sqrt{3x}}{15}$ [c] $\dfrac{x^3\sqrt{3x}}{5}$ [d] None of the above

37. Divide: $(m^2 - 7m - 11) \div (m - 8)$

[a] $m + 1 - \frac{3}{m-8}$ [b] $m - 15 + \frac{120}{m-8}$ [c] $-m - 1 - \frac{3}{m-8}$ [d] None of the above

38. The function *f(x)* is defined as $f(x) = \dfrac{\frac{1}{x}+b}{b-x}$ with $b > 0$. Compute $f\left(\dfrac{1}{b}\right)$.

[a] -1 [b] $\dfrac{2b^2}{(b-1)(b+1)}$ [c] $\dfrac{2b}{b^2+1}$ [d] None of the Above

39. Given the quadratic equation $P(x) = -ax^2 - ax + \dfrac{1}{a}$ if $a < 0$, the graph of $P(x)$ will

[a] open upward [b] open downward [c] both open upward and downward [d] None of the above

40. Write the formula for the nth term of the sequence. 2, 6, 10, 14, …

[a] $a_n = 4n - 2$ [b] $a_n = 2 + 4n$ [c] $a_n = 2 - 4n$ [d] None of the above

41. Simplify and write in standard form $\frac{7+4i}{2-5i}$.

[a] -1 [b] $\frac{6-43i}{21}$ [c] $\frac{6}{29} - \frac{43}{29}i$ [d] None of the above

42. From a point on level ground 125 feet from the base of a tower, the angle of elevation to the top of the tower is 57.2°. Approximate the height of the tower to the nearest foot.

[a] 95.29 feet [b] 105.07 feet [c] 193.96 feet [d] None of the above

43. A building that is 21 meters tall casts a shadow 25 meters long. Find the angle of elevation of the sun.

[a] 32.86° [b] 40.03° [c] 57.14° [d] None of the above

44. A right triangle has leg 21 and hypotenuse 29, what is the length of the missing leg.

[a] 8 [b] 20 [c] 35.8 [d] None of the above

45. The perimeter of an equilateral triangle is $21a^3b^6 + 3a - 3$ units. Find the length of a side.

[a] 21 units [b] $7ab^2 + 3$ units [c] $7a^3b^6 + a - 1$ units [d] None of the above

46. Simplify and write in scientific notation. $(6.1 \times 10^{-3})(5 \times 10^{-2})$

[a] 3.05×10^{-5} [b] 3.05×10^{-6} [c] 30.5×10^{-5} [d] None of the above

47. Solve the system of linear equations.

$$\begin{cases} y = -5x \\ 5x + y = 9 \end{cases}$$

[a] (0, 0) [b] no solutions [c] infinite number of solution [d] None of the above

48. Find the amount of 14% saline solution that should be added to 80 cc (cubic centimeters) of 24% saline solution in order to have 18% solution.

[a] 10 cc [b] 120 cc [c] 170 cc [d] None of the above

49. Two bikers start at opposite ends of a trail and bike toward each other. The trail is 132 miles long and they meet in 4 hours. If one biker is twice as fast as the other, find the speed of the slower biker.

[a] 11 mph [b] 22 mph [c] 44 mph [d] None of the above

50. Given the quadratic equation $x^2 - kx + k - 1 = 0$, with k a real number, the equation has two distinct real solutions

[a] $for\ no\ k$ [b] $for\ \ k = 2$ [c] $for\ all\ k$ [d] None of the above

Answers:

1	A	26	B
2	B	27	A
3	B	28	C
4	C	29	A
5	A	30	B
6	A	31	A
7	C	32	A
8	D	33	B
9	B	34	C
10	A	35	D
11	B	36	B
12	A	37	A
12	D	38	B
14	C	39	A
15	C	40	A
16	A	41	C
17	A	42	C
18	C	43	B
19	C	44	B
20	A	45	C
21	A	46	D
22	C	47	B
23	B	48	B
24	A	49	B
25	D	50	C