

## ALGEBRA I

1- Simplify the following expression.  $3x - 5[4 - 7(3 - 2x)] = ?$

- a)  $-27x + 45$
- b)  $33x - 45$
- c)  $-67x + 85$
- d)  $-27x - 45$
- e)  $67x - 85$

2- Evaluate  $-2x^2y^3 - xy^2$ , if  $x = -2, y = 1$ .

- a) 10
- b) 18
- c) -6
- d) -14
- e) 50

3- Jenny types 150 pages in 5 hours. If Mary helps Jenny, it takes 2 hours to type 150 pages. How long would it take Mary to type 150 pages alone?

- a) 3 hr 50 min
- b) 3 hr 40 min
- c) 3 hr 30 min
- d) 3 hr 20 min
- e) 3 hr 10 min

4- Perform the following operation.  $\frac{2x^2 + 3x - 2}{2x^2 - 7x + 6} \div \frac{1 - 4x^2}{2x^2 - 3x - 2} =$

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

5- If  $(x, y)$  is a solution of  $\begin{cases} 2x - 3y = 10 \\ 3x - 2y = -5 \end{cases}$  then  $2x - y = ?$

- a)  $-2$
- b)  $22$
- c)  $-22$
- d)  $6$
- e)  $-6$

6- Jamal's company reduced his salary by 15%. After four months, Jamal got a 15% raise. What percent of his original salary is his latest salary?

- a) 115%
- b) 100%
- c) 98.50%
- d) 97.75%
- e) 92.50%

7- The parabola  $y = x^2 + 2x - 3$  is shifted 2 units up and 2 units left. What is the new y-intercept?

- a)  $-1$
- b)  $1$
- c)  $3$
- d)  $5$
- e)  $7$

8- What is the domain of  $f(x) = \frac{2x-1}{\sqrt{1-2x}}$ ?

- a)  $(-\infty, \frac{1}{2})$
- b)  $(\frac{1}{2}, +\infty)$
- c)  $(-\frac{1}{2}, \frac{1}{2})$
- d)  $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, +\infty)$
- e)  $(-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, +\infty)$

9- Simplify.  $\frac{1 - \frac{1}{a}}{1 + \frac{1}{a}} = ?$

a)  $-1a$

b)  $\frac{a^2 + 1}{a^2 - 1}$

c)  $\frac{a + 1}{a - 1}$

d)  $\frac{a - 1}{a + 1}$

e)  $\frac{a^2 - 1}{a^2 + 1}$

10- If  $27^{2x} = \frac{1}{27}$ , then  $2^{2x} = ?$

a)  $-2$

b)  $\frac{1}{2}$

c)  $\frac{1}{3}$

d)  $\frac{-1}{3}$

e)  $\frac{-1}{2}$

11- If the equation of a line with slope  $m = -\frac{1}{3}$  passes through  $\left(\frac{3}{2}, \frac{3}{2}\right)$ ,

then the x - intercept is

a) 2

b) 3

c) 4

d) 6

e) 9

12- If  $f(x) = -x^2 + 2x - 4$  then  $f(-x + 3) = ?$

- a)  $-x^2 - 8x - 7$
- b)  $x^2 - 8x + 12$
- c)  $x^2 + 4x + 12$
- d)  $-x^2 + 4x - 7$
- e)  $-x^2 + 8x + 7$

13- Bill drove 50 mph for six hours to visit his mother. On the way coming back his speed was 30 mph. What is his average speed in miles per hour for the whole trip?

- a) 34
- b) 36
- c) 37.5
- d) 40
- e) 42

14- Solve  $10x^2 + 27x - 16 = 0$  for x. The solutions are

- a)  $x = 16, x = -\frac{13}{10}$
- b)  $x = \frac{1}{2}, x = -\frac{16}{5}$
- c)  $x = 8, x = -5$
- d)  $x = -1, x = -16$
- e)  $x = 16, x = \frac{43}{10}$

15- Jeremy has a mixture of 26 dimes and quarters. If his quarters were dimes and his dimes were quarters, he would have \$0.60 more. How much money did he have originally?

- a) \$4.55
- b) \$4.85
- c) \$4.25
- d) \$4.10
- e) \$4.70

16- Find the area of a square if its diagonal is 6 inches long.

- a) 6 square inches
- b) 9 square inches
- c) 12 square inches
- d) 18 square inches
- e) 36 square inches

17- If  $\frac{1}{a} - \frac{1}{x} = \frac{1}{b}$  with  $a, x, b \neq 0$  then  $x$  will be

a)  $\frac{ab}{a-b}$

b)  $\frac{b}{a-b}$

c)  $\frac{b}{b-a}$

d)  $\frac{a}{b-a}$

e)  $\frac{ab}{b-a}$

18- If  $x^2 + 4x = 21$ , then the set of possible values for  $x-3$  is

a)  $\{-6, 4\}$

b)  $\{0, -4\}$

c)  $\{6, 10\}$

d)  $\{0, -10\}$

e)  $\{6, -10\}$

19- Simplify the following expression.  $\frac{-3 - |-15| \div 3 - 2^2}{3 - 2|4| \div 2^2 + 1}$

a) 0

b) -1

c) -3

d) -5

e) -6

20- If  $f(x) = 2x^2 - 8x + 7$ , then the vertex is located at

a)  $(-2, -1)$

b)  $(2, -1)$

c)  $(-2, 1)$

d)  $(2, 1)$

e)  $(2, -2)$

21- The sum of the largest and the smallest solutions of the equation

$$x^3 - 4x^2 + x + 6 = 0 \text{ is}$$

- a) -2
- b) -1
- c) 1
- d) 2
- e) 3

22- Simplify.  $\left(\frac{2x^3y^{-2}}{x^2y^2w}\right)^3 = ?$

- a)  $2x^3y^{-12}w^{-3}$
- b)  $8x^3y^{-12}w^{-3}$
- c)  $8xw^{-3}$
- d)  $8x^3w^{-3}$
- e)  $8x^3w^3$

23- Simplify  $(x - y)^2 - (y + x)^2$

- a) 0
- b)  $4x^2 - 4xy$
- c)  $4x^2 - 4y^2$
- d)  $-4xy$
- e)  $4y^2 - 4xy$

24- Simplify.  $\frac{1}{1 - \frac{1}{1 - \frac{1}{2}}}$

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

25-If  $f(x) = -x^2 - 3x - 1$  and  $g(x) = 3x + 4$  then  $g(f(-1)) = ?$

- a) 13
- b) -5
- c) -14
- d) 7
- e) 5

26- If  $|2 - x| = |b - 2|$  then the solution set for  $x$  is

- a)  $\{b, 4 + b\}$
- b)  $\{b, 4 - b\}$
- c)  $\{b, b - 4\}$
- d)  $\{b + 4, b - 4\}$
- e)  $\{b + 4, 4 - b\}$

27- Rationalize the denominator.  $\frac{7}{\sqrt{9} - \sqrt{7}}$

- a)  $\frac{21 - 7\sqrt{7}}{2}$
- b)  $\frac{7 + \sqrt{16}}{2}$
- c)  $\frac{21 + \sqrt{49}}{2}$
- d)  $\frac{21 + 7\sqrt{7}}{2}$
- e)  $\frac{7\sqrt{16}}{2}$

28-Simplify.  $\frac{3x^{-2} + 1}{4x^{-1} + 1}$

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

29- If  $16 = 2^{x-1}$  and  $y^{-4} = \frac{1}{81}$ . Then  $2x^y$  will be

- a) 18
- b) 24
- c) 162
- d) 216
- e) 250

30- Solve for y.  $a - by = cy + d$

- a)  $\frac{a+d}{b+c}$
- b)  $\frac{a-d}{b+c}$
- c)  $\frac{a-d}{b-c}$
- d)  $\frac{a+d}{b-c}$
- e)  $\frac{d-a}{b+c}$

31- Four years ago Tarick was three years older than twice Deonte's age then. Six years from now the sum of their ages will be 38. Find the difference of their present ages.

- a) 7
- b) 8
- c) 9
- d) 10
- e) 11

32- Simplify.  $\sqrt{\frac{x^2}{16} + \frac{x^2}{25}}$

- a)  $\frac{9x}{20}$
- b)  $\frac{2x}{20}$
- c)  $\frac{x\sqrt{2}}{20}$
- d)  $\frac{6x}{20}$
- e)  $\frac{x\sqrt{41}}{20}$



33-  $f(x) = x^2 - 4x + 3$  and  $g(x) = x - 1$ . If  $h(x) = (f \circ g)(x)$ , then the range of  $h(x)$  is

- a)  $(-\infty, -1]$
- b)  $[-1, 3]$
- c)  $(3, +\infty)$
- d)  $[-1, +\infty)$
- e)  $(-\infty, 3]$

34- If 25 apples cost  $m$  dollars, how many cents would  $n$  apples cost?

- a)  $\frac{mn}{25}$
- b)  $25nm$
- c)  $4mn$
- d)  $\frac{mn}{4}$
- e)  $25(m + n)$

35- The ARC coffee company sells cashews for \$5.50 per pound and peanuts for \$3.50 per pound. The company wants to make five pound packages of mixed nuts and sell them for \$4.00 per pound. How many pounds of peanuts should be in the mix?

- a)  $1\frac{1}{4}$
- b)  $2\frac{1}{2}$
- c)  $2\frac{3}{4}$
- d)  $3\frac{1}{2}$
- e)  $3\frac{3}{4}$

36- If  $f(x) = 2 - 3x$  then  $\frac{f(x) - f(2)}{x - 2}$  would be

a)  $\frac{-3x - 6}{x - 2}$

b)  $\frac{-3x - 2}{x - 2}$

c)  $\frac{-3x + 6}{x - 2}$

d)  $\frac{-6x + 12}{x - 2}$

e)  $\frac{6x - 12}{x - 2}$

37- Find  $b$  such that the line through  $(2, 3)$  and  $(4, -5)$  will be perpendicular to the line through  $(4, -5)$  and  $(b, b)$ .

a)  $-1$

b)  $-3$

c)  $-8$

d)  $3$

e)  $8$

38- The coordinates of  $P$  and  $Q$  are  $(-4, 6)$  and  $(6, -2)$  respectively. Which of the following are the coordinates of a point  $R$  such that  $PR = \frac{1}{4}PQ$ ?

a)  $\left(0, \frac{5}{2}\right)$

b)  $\left(\frac{-3}{2}, 4\right)$

c)  $\left(\frac{7}{2}, 0\right)$

d)  $\left(4, \frac{-1}{2}\right)$

e)  $\left(\frac{-3}{2}, \frac{-1}{2}\right)$

39- Women make up  $\frac{2}{3}$  of the faculty of a high school. Twelve of the men of the faculty are unmarried while  $\frac{3}{5}$  of the male teachers are married. The total number of faculty members in this school is

- a) 30
- b) 50
- c) 60
- d) 73
- e) 90

40- If  $3x = 2y$  and  $6y = 7z$ , what is the ratio of  $x$  to  $z$ ?

- a) 2:3
- b) 7:9
- c) 3:2
- d) 5:7
- e) 9:7