

1. If  $k = 2$ , what is the value of  $3k^2 - 2k - 6$ ?
- 2
  - 6
  - 2
  - 4
2. The area of a circle with radius  $r$  is  $\pi r^2$ . If  $p$  is the center of the circle with radius of  $(x + 2)$ , what is the area of the circle?
- $\pi (x^2 + 4x + 9)$
  - $x^2 + 4x + 4$
  - $x^3 + 9x + 1$
  - $\pi (x^2 + 4x + 4)$
3. If  $2x + y = 80$  and  $12 \leq x \leq 20$ , what is the least possible value of  $y$ ?
- 10
  - 56
  - 25
  - 40
4. Which of the following is not equivalent  $\frac{a}{b} - \frac{b}{a}$ ?
- $\frac{a - b}{ab}$
  - $a \left( \frac{1}{b} - \frac{b}{a^2} \right)$
  - $\frac{a^2 - b^2}{ab}$
  - $\frac{(a - b)(a + b)}{ab}$
5. Simplify  $\frac{rs + s}{s}$
- $r$
  - $rs$
  - $r + 1$
  - $rs + 1$

6. A ball is sitting at the top of a hill. John sets the ball rolling downhill so that it accelerates at a rate of 20 meters / sec<sup>2</sup>. How long will it take the ball to roll 90 meters?

[The distance a ball rolls at a certain rate of acceleration

over a given amount of time is given by the formula  $s = \frac{1}{2} at^2$ ,

where  $s$  is the distance rolled,  $a$  is the rate of acceleration, and  $t$  is the time]

- a. 3 seconds
- b. 10 seconds
- c.  $\sqrt{3}$  seconds
- d. 20 seconds

7. Which of the following is equal to  $- | -(2^3) |$  ?

- a.  $-2^3$
- b.  $2^3$
- c.  $| -(2^3) |$
- d.  $| -2^3 |$

8. The volume of a rectangular object is  $2x^3 + 2x^2 - 8x - 8$ . If the length is given as  $x + 2$ , and the width is given as  $x - 2$ , what is the height of the object?

- a.  $2x + 10$
- b.  $x^2 + 2$
- c.  $2x + 2$
- d.  $x + 2$

9. A rectangle is 10 centimeters longer than it is wide, and has an area of 390 square centimeters. If  $L$  represents the length of a rectangle, which of the following equations can be used to determine that length?

- a.  $L^2 - 10L = 390$
- b.  $L^2 - 10 = 390$
- c.  $4L - 12 = 390$
- d.  $4L - 5 = 390$

10. One possible factor of  $4x^2 - 16y^2$  is

- a.  $x - 8y$
- b.  $4x - 8y$
- c.  $2x - 16y$
- d.  $2x + 10y$

11. The Justins took a long car trip. The distance they traveled each day can be determined using  $d = rt$ , where  $r$  is the average speed in miles / hour and  $t$  is the number of hours they traveled. On the first day, the Justins traveled at a speed of  $\frac{2p}{n}$  for  $\frac{n+1}{p}$  hours. How far did they travel?

a.  $\frac{2pn}{n+1}$

b.  $\frac{2n+2}{p}$

c.  $1+2n$

d.  $2 + \frac{2}{n}$

12. What is the perimeter of the triangle in terms of  $x$  if the sides are  $6x+2$ ,  $3x+4$ , and  $2x+10$ ?

a.  $9x+17$

b.  $11x+16$

c.  $26x$

d.  $20x^2+40$

13. Simplify  $\frac{\frac{v}{2d}}{\frac{2d}{2v}}$

a.  $\frac{v^2}{2d^2}$

b.  $\frac{2d^2}{v^2}$

c.  $\frac{3}{d^2}$

d.  $\frac{2}{v^2}$

14. If  $|x+4| = 10$ , and  $x < 0$ , what is the value of  $x$ ?

a. 6

b. -14

c. 3

d. -2

15. Which of the following is equivalent to  $\sqrt{\frac{36 x^{25} y^6}{4 x^9 y^2}}$  ?

- a.  $3 x^8 y^2$
- b.  $3 x^4 y^2$
- c.  $9 x^4 y^6$
- d.  $3 x^2 y^2 (\sqrt{xy})$

16. Simplify  $\frac{10}{1 + \frac{2}{x}}$

- a.  $\frac{10}{x+2}$
- b.  $\frac{10x}{x+2}$
- c.  $\frac{1}{10} + \frac{x}{2}$
- d.  $\frac{5(x+2)}{x}$

17.  $\frac{16k^3 + 8k^2 - k}{2k}$  is equivalent to all of the following except for

- a.  $\frac{k(16k^2 + 8k - 1)}{2k}$
- b.  $8k^2 + 4k - \frac{1}{2}$
- c.  $\frac{16k^2 + 8k - 1}{2}$
- d.  $16k^3 + k^2$

18. If a right circular cone which has radius  $p$  and its height is twice its radius which of the following is the right equation for the volume

$V$ ? [The formula for the volume of a right circular cone is  $\text{Volume} = \frac{1}{3} \pi r^2 h$ ,

where  $r$  is the radius and  $h$  is the height]

a.  $V = \frac{2}{3} \pi p^2$

b.  $V = \frac{4}{3} \pi p^2$

c.  $V = \frac{2}{3} \pi p^3$

d.  $V = \frac{4}{3} \pi p^3$

19. If  $RZ = S - Z$  then  $Z = ?$

a.  $\frac{S}{2R}$

b.  $\frac{S}{R+1}$

c.  $\frac{S-R}{2}$

d.  $\frac{S}{R} - 1$

20. Jessica wants to buy a pair of shoes. The shoes are now on sale for 20 % off. She also gets a 10 % discount for being a member of the store. Her member discount is taken off the sale price of any item. If the original cost of the shoes were  $P$ , which of the following is her final cost?

a.  $0.80 P$

b.  $0.72 P$

c.  $0.30 P$

d.  $0.25 P$

21. Simplify  $(-3 a^2 b^4) (4 a^2 b)$

a.  $-12 a^4 b^5$

b.  $-12 a^2 b^4$

c.  $a^2 b^5$

d.  $-7 a^4 b^5$

22. When simplifying  $\frac{4 b^2 + 16 b}{b^2} \div \frac{60}{b^2 + 4 b}$ ,

which of the following is the final denominator of the resulting expression?

- a.  $\frac{1}{15}$
- b.  $50b$
- c.  $b^2 + 4b$
- d.  $15$

23. Suzy made  $\frac{a}{b}$  dollars working at the mall. Ron made  $\frac{a-b}{b}$  dollars. Sam made  $\frac{4}{3}$  as much as Suzy. If they pool all their money, how much money will they have?

- a.  $1 - \frac{3b}{10a}$
- b.  $\frac{10a}{3b} - 1$
- c.  $\frac{a}{b} - \frac{1}{3}$
- d.  $25 + \frac{a}{b-a}$

24. Simplify  $(15x - x) + (2y - 19y)$

- a.  $14y - 17x$
- b.  $17$
- c.  $-14$
- d.  $14x - 17y$

25. Simplify  $\frac{\frac{5}{b} - \frac{5}{a}}{\frac{1}{b^2} - \frac{1}{a^2}}$

- a.  $5ab$
- b.  $0$
- c.  $\frac{5ab}{a+b}$
- d.  $\frac{5}{a^2 - b^2}$

26. Factor  $60x - 10$

- a.  $10(6x - 1)$
- b.  $2(40x - 5)$
- c.  $60(x - 1)$
- d.  $5(10x - 2)$

27. If  $\frac{9}{x} - p = \frac{5}{n}$  then  $x = ?$

a.  $\frac{9n}{5 + pn}$

b.  $\frac{5 + pn}{9n}$

c.  $\frac{p + 3}{n}$

d.  $x - \frac{5}{n}$

28. If  $-2(3x + 1) = -10x + 6$  then  $x = ?$

- a. 3
- b. 0
- c. -5
- d. 2