1. If \( x \geq 0 \), the expression \( \sqrt{x^2 + 4x + 4} \) is equivalent to
   - A) \( x + 2\sqrt{x} + 2 \)
   - B) \( x + 2\sqrt{x} + 1 \)
   - C) \( 2\sqrt{4}x \)
   - D) \( x + 2 \)
   - E) none of the above

2. The slope, \( m \), and the \( y \)-intercept, \( b \), of the line with equation \( 2(x - 3) = -3(y + 5) \) are
   - A) \( m = -3, \ b = 5 \)
   - B) \( m = 2, \ b = -9 \)
   - C) \( m = -\frac{3}{2}, \ b = -9 \)
   - D) \( m = -\frac{2}{3}, \ b = -3 \)
   - E) none of the above

3. If the equation \( s = \frac{a - mr}{1 - r} \) is solved for \( r \), then \( r = \)
   - A) \( \frac{a}{m} \)
   - B) \( \frac{s}{s - m} \)
   - C) \( \frac{s - a}{s - m} \)
   - D) \( s - a + m \)
   - E) none of the above

4. Simplify: \( \frac{r^3 - 2r^2}{r^2} \)
   - A) \( 2r \)
   - B) \( r - 2 \)
   - C) \( -2r \)
   - D) \( \frac{r}{2} \)
   - E) none of the above

5. \( \left( \frac{P^{15}}{P^{20}} \right)^2 \) equals:
   - A) \( P^{10} \)
   - B) \( P^2 \)
   - C) \( P^{-3} \)
   - D) \( P^{5} \)
   - E) none of the above

6. A line passes through the points (2, -5) and (-1,3). The slope of the line is
   - A) \( -\frac{7}{3} \)
   - B) \( \frac{3}{4} \)
   - C) \( -\frac{8}{3} \)
   - D) \(-8\)
   - E) none of the above
7. If \( Z = \frac{X - \mu}{\sigma} \), then \( \mu = \) 

A) \( \sigma(X - Z) \)  
B) \( \frac{X}{\sigma} - Z \)  
C) \( \frac{X - Z}{\sigma} \)  
D) \( X - Z\sigma \)  
E) none of the above

8. Simplify \( \frac{3x^0 - y^0}{3y^0} \) 

A) 1  
B) 0  
C) -1  
D) \( \frac{2}{3} \)  
E) none of the above

9. Let \( P(x) = -x^4 + 3x - 1 \). Find and simplify \( P(-2) \). 

A) 23  
B) 9  
C) -9  
D) 1  
E) -23

10. Solve for \( n \) in the following equation: \( 2z\sqrt{\frac{p(1-p)}{n}} = w \) 

A) \( \frac{2zp(1-p)}{w} \)  
B) \( \frac{4z^2w}{p(1-p)} \)  
C) \( \frac{4z^2p(1-p)}{w^2} \)  
D) \( \frac{4z^2w^2}{p(1-p)} \)  
E) none of the above

11. The perimeter of a rectangle is 72 inches. Find the area of the rectangle if twice the length added to three times the width is 88 inches. 

A) 200 square inches  
B) 240 square inches  
C) 320 square inches  
D) 280 square inches  
E) none of the above

12. Jennifer bicycled the 13 miles to the Eklutna Glacier in two hours. Part of the time the dirt road was uphill, and she traveled at 6 miles per hour. The rest of the time she traveled 10 miles per hour. How long did Jennifer bike at 10 miles per hour? 

A) 15 minutes  
B) 25 minutes  
C) 35 minutes  
D) 45 minutes  
E) none of the above
13. A student has scores of 70, 77, 85 on three exams. What score is needed on a fourth exam to make the average 80 or better?

A) 78 or higher          B) 78.7 or higher          C) 88 or higher
D) 80 or higher          E) none of the above

14. Madison and St. Louis are 385 miles apart. One train leaves Madison and heads toward St. Louis at the rate of 30 miles per hour. Three hours later, a second train leaves Madison, also bound for St. Louis. If the second train travels at the rate of 55 miles per hour, in how many hours will the faster train overtake the slower train?

A) $6 \frac{3}{5}$ hr          B) $1 \frac{1}{17}$ hr          C) $11 \frac{11}{18}$ hr
D) $3 \frac{3}{5}$ hr          E) none of the above

15. A restaurant sold 100 orders of fries and 50 burgers for a total of $195. The next day it sold 300 orders of fries and 200 burgers for $695. How much did one order of fries cost?

A) $1.18          B) $0.85          C) $1.96          D) $0.75          E) none of the above

16. The height of a triangle is 4 meters longer than twice its base. Find the height of the triangle if its area is 15 square meters.

A) 5          B) 10          C) 15          D) 20          E) none of the above

17. In seawater, the pressure $p$ is related to the depth $d$ according to $33p - 18d = 495$, where $d$ is in feet and $p$ is in pounds per square inch. The Titanic was discovered at a depth of 12,460 ft. The pressure at this depth in pounds per square inch is approximately

A) 228,115.8          B) 6,811.36          C) 14,952          D) none of the above

18. The value $y$ of a building after $x$ years of use has the following relation:

$$x = 240 - \frac{y}{1500}$$

For an additional 5 years, the house

A) appreciates by $7,500          B) depreciates by $7,500          C) depreciates by $2,700
D) depreciates by $12,000          E) value remain the same
19. At 6am a train traveling at 50 mph leaves Anchorage for Fairbanks. Three hours later a train traveling at 40 mph leaves Fairbanks to Anchorage. Assume that the distance between the two destinations is 330 miles. At what time the trains will pass each other?

A) 10:30am  B) 12:00noon  C) 11:30am  D) 11:00am

E) none of the above

20. Geoff bicycles 160 miles on the Glenn Highway at \( r \) miles per hour. The same trip would have taken 2 hours longer if he had decreased his speed by 4 miles per hour. Find \( r \).

A) 10 mph  B) 15 mph  C) 20 mph  D) 25 mph

E) none of the above

21. Lou’s Landscaping provides rose bushes for the city of Anchorage beautification project. She will charge $1,000 to the Anchorage Municipality for a lot of 100 bushes. However, for each additional lot of 100 bushes the city agrees to purchase, she will decrease the price of a lot by $50. Let \( x \) be the number of additional lots purchased and \( R \) be the total revenue derived from the sale. The relation between \( x \) and \( R \) is given by

A) \( R = 50x^2 - 950x - 1000 \)  B) \( R = -50x^2 + 950x + 1000 \)

C) \( R = 50x^2 - 1050x + 1000 \)  D) \( R = -50x^2 + 500x + 100000 \)

E) none of the above