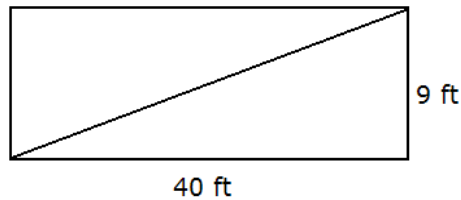


1. Simplify the expression  $\sqrt[3]{\frac{x^{11}y^5}{x^2y^2}}$
- A)  $x^{\frac{11}{2}}y^{\frac{3}{2}}$       B)  $x^3y$       C)  $x^4y\sqrt[3]{xy}$       D)  $x^2$
2. Simplify the expression  $\frac{x^2 + 2x - 15}{x^2 - 8x + 15}$
- A)  $-\frac{1}{4}$       B)  $\frac{x+3}{x-3}$       C)  $-1$       D)  $\frac{x+5}{x-5}$
3. Simplify the expression  $\sqrt{12} - 2\sqrt{75} + \sqrt{48}$
- A)  $-4\sqrt{3}$       B)  $9\sqrt{3} + \sqrt{10}$       C)  $\sqrt{3}$       D)  $-3\sqrt{10}$
4. Two airplanes leave an airport at the same time, traveling in opposite directions. One travels 25 miles per hour faster than the other. After 2 hours, the planes are 690 miles apart. What is the speed of the faster plane?
- A) 145 miles per hour      C) 185 miles per hour  
B) 160 miles per hour      D) 205 miles per hour
5. Solve the system of equations given below.
- $$\begin{aligned}2x - 3y &= 16 \\x + 8y &= -87\end{aligned}$$
- A)  $(-4, -8)$       B)  $(23, 10)$       C)  $(-7, -10)$       D) The system is dependent.
6. Perform the indicated operations and simplify.  $(3 - 2\sqrt{5})(\sqrt{5} - 1)$
- A)  $-8\sqrt{5}$       B)  $\sqrt{5} + 7$       C)  $5\sqrt{5} - 13$       D)  $5\sqrt{5} - 17$
7. Find the **exact value** of the expression  $27^{-\frac{2}{3}}$ .
- A)  $-18$       B)  $\frac{1}{9}$       C)  $\frac{\sqrt{3}}{243}$       D)  $0.11$
8. Find all real solutions of the equation  $x^2 = 2x + 1$
- A)  $x = 1 + \sqrt{8}$  or  $x = 1 - \sqrt{8}$       C) There is no real solution.  
B)  $x = -1$       D)  $x = 1 + \sqrt{2}$  or  $x = 1 - \sqrt{2}$

9. Find the length of the diagonal of the rectangle shown on the picture below.



- A)  $7\sqrt{31}$  ft      B) 41 ft      C) 49 ft      D)  $6\sqrt{10}$  ft
10. Solve the equation  $\frac{2x+3}{5} - \frac{x-5}{3} = 1$   
A) There is no solution.      B) 31      C) -33      D) -19
11. Solve the equation  $\left|\frac{1}{3}x - 1\right| + 3 = 7$ .  
A) -9, 15      B) -27, 15      C) -11, 13      D) 9
12. Rationalize the denominator in the expression  $\frac{3}{\sqrt{10}+1}$ .  
A)  $\frac{\sqrt{10}-1}{3}$       B)  $\sqrt{10}+3$       C)  $\frac{\sqrt{10}+1}{3}$       D)  $\sqrt{10}-3$
13. Solve the inequality  $-2 \leq \frac{1}{3}x - 1 \leq 5$   
A) [-9, 12]      B) [-9, 18]      C) [-5, 16]      D) [-3, 18]
14. How many liters of a 17% acid solution should be mixed with 8 liters of an 11% acid solution to obtain a mixture that is 15%?  
A) 11 liters      B) 13 liters      C) 16 liters      D) 19 liters
15. We have invested a total of \$5000 in two bank accounts. One account earns 7% interest per year, the other earns 8% per year. After one year, the combined interest from the two account was \$382. How much money did we invest at 8%?  
A) \$1700      B) \$2500      C) \$3200      D) \$4200
16. Find all solutions of the equation  $\sqrt{2x-1} = 5$   
A) 3 and -2      B) -12 and 13      C) no solution      D) 13

17. Find the distance between the points  $(-4, -5)$  and  $(1, 7)$ .

- A) 13 units                      B)  $\frac{12}{5}$  units                      C) 17 units                      D)  $\sqrt{119}$  units

18. Simplify the expression  $(3 - \sqrt{5})^2$ .

- A) 4                                  B)  $14 - 6\sqrt{5}$                       C)  $8\sqrt{5}$                       D) 20

19. Find all real solutions of the equation  $x^2 + 2x + 5 = 0$ .

- A) There is no solution among the real numbers                      C)  $-1 + \sqrt{6}$  and  $-1 - \sqrt{6}$   
B)  $-2\sqrt{5}$                                   D)  $-1 + \sqrt{24}$  and  $-1 - \sqrt{24}$

20. Find an equation of the straight line that is parallel to  $y - 7 = -2(x + 2)$  and passes through the point  $(-6, 1)$ .

- A)  $y = \frac{1}{2}x + 4$                       B)  $y = -\frac{1}{2}x - 2$                       C)  $y = 2x + 13$                       D)  $y = -2x - 11$

21. Find an equation of the straight line that is perpendicular to  $y - 7 = -2(x + 2)$  and passes through the point  $(-6, 1)$ .

- A)  $y = \frac{1}{2}x + 4$                       B)  $y = -\frac{1}{2}x - 2$                       C)  $y = 2x + 13$                       D)  $y = -2x - 11$

22. Factor completely:  $3x^3 - 24$

- A)  $3(x - 2)^3$                                   C)  $3(x - 2)(x^2 + 2x + 4)$   
B)  $3(x - 2)(x^2 - 2x + 4)$                       D)  $(3x - 2)(x^2 + 2x + 12)$

23. Simplify:  $\frac{2m - 1}{m^2 - m - 2} - \frac{1}{m + 1}$

- A)  $\frac{m - 3}{m^2 - m - 2}$                       B)  $\frac{1}{m - 2}$                       C)  $\frac{2(m - 1)}{m^2 - 2m - 1}$                       D)  $\frac{-m - 3}{2m + 2}$

24. Simplify:  $\frac{\frac{3}{x-1} - 1}{\frac{2}{x-1} + 1}$

- A)  $\frac{-x + 2}{x + 1}$                                   B)  $\frac{3}{2}$                                   C)  $\frac{2}{3}$                                   D)  $\frac{-x + 4}{x + 1}$

25. Find all solutions of the equation  $\frac{3}{p - 7} + \frac{p + 7}{p} = \frac{7p - 28}{p(p - 7)}$

- A)  $p = 14$                       B)  $p = -11$  or  $p = 7$                       C)  $p = -3$  or  $p = 7$                       D)  $p = -3$

26. Solve the equation  $|x + 1| = |3x - 1|$   
A)  $x = 0$  or  $x = 1$       B)  $x = 0$       C)  $x = 1$       D)  $x = 1$  or  $x = -1$
27. Suppose that  $f$  is a function given by  $f(x) = x^2 + 4x + 2$ . Compute the value of  $f(-5)$ .  
A) 7      B) -43      C) -3      D) 3
28. Suppose that  $f$  is a function given by  $f(x) = \frac{1}{x^2 - 16}$ . What is the domain of  $f$ ?  
A)  $(-\infty, -4) \cup (4, \infty)$       C)  $[-4, 4]$   
B) all real numbers except  $-4$  and  $4$       D)  $4$  and  $-4$
29. The graph of which equation shown below is a parabola with its vertex at  $(3, -4)$ ?  
A)  $y = x^2 - 3x - 4$       C)  $y = x^2 - 6x + 5$   
B)  $y = x^2 + 3x - 22$       D)  $y = x^2 + 6x - 31$
30. Solve the compound inequality given below.  
$$3 - x \geq -2x + 5 \quad \text{and} \quad 2(x - 7) < x + 4$$
  
A)  $[2, 18)$       B)  $(-\infty, 2] \cup (18, \infty)$       C)  $(-\infty, 2]$       D)  $(-\infty, \infty)$
31. Solve the compound inequality given below.  
$$3 - x \geq -2x + 5 \quad \text{or} \quad 2(x - 7) < x + 4$$
  
A)  $[2, 18)$       B)  $(-\infty, 2] \cup (18, \infty)$       C)  $(-\infty, 2]$       D)  $(-\infty, \infty)$
32. Find the coordinates of the vertex of the parabola  $y = 2x^2 - 20x + 18$   
A)  $(5, -32)$       C)  $(-5, -32)$   
B)  $(5, -16)$       D)  $(-5, -16)$