

Work the following problems paying careful attention to formatting.. One person from each group will hand in the work. Compare your answers and decide who will turn in this assignment for the group. Make sure each group member's name is on the sheet to be turned in! You must work as a group to earn credit. **No individual submissions.**

1. Use the product rule to simplify, if possible.

$$\begin{aligned} \text{a. } z^3 \cdot z^{11} &= z^{3+11} \\ &= z^{14} \end{aligned}$$

$$\begin{aligned} \text{b. } a \cdot a^4 \cdot a^7 &= a^{1+4+7} \\ &= a^{12} \end{aligned}$$

$$\text{c. } x^3 y^3 \text{ cannot be simplified}$$

2. Use the power rule to simplify.

$$\begin{aligned} \text{a. } (7^3)^4 &= 7^{3 \cdot 4} \\ &= 7^{12} \end{aligned}$$

$$\begin{aligned} \text{b. } (c^7)^3 &= c^{7 \cdot 3} \\ &= c^{21} \end{aligned}$$

$$\begin{aligned} \text{c. } [(-5)^4]^7 &= (-5)^{4 \cdot 7} \\ &= (-5)^{28} \\ &= 5^{28} \end{aligned}$$

3. Use the products-to-powers rule to simplify.

$$\begin{aligned} \text{a. } (3m)^3 &= 3^3 m^3 \\ &= 27m^3 \end{aligned}$$

$$\begin{aligned} \text{b. } (-2p)^4 &= (-2)^4 p^4 \\ &= 16p^4 \end{aligned}$$

$$\begin{aligned} \text{c. } (5r)^2 &= 5^2 r^2 \\ &= 25r^2 \end{aligned}$$

4. Solve and check  $z + 13 = -15$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned}z + 13 &= -15 \\z + 13 - 13 &= -15 - 13 \\z &= -28\end{aligned}$$

$$\begin{aligned}\text{Check: If } z &= -28, \\ \text{then } z + 13 &= -28 + 13 \\ &= -15 \checkmark\end{aligned}$$

The solution is  $-28$ .

5. Solve and check  $t + \frac{2}{3} = -\frac{7}{6}$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned}t + \frac{2}{3} &= -\frac{7}{6} \\t + \frac{2}{3} - \frac{2}{3} &= -\frac{7}{6} - \frac{2}{3} \\t &= -\frac{7}{6} - \frac{2}{3} \cdot \frac{2}{2} \\t &= -\frac{7}{6} - \frac{4}{6} \\t &= -\frac{11}{6}\end{aligned}$$

$$\begin{aligned}\text{Check: If } t &= -\frac{11}{6}, \\ \text{then } t + \frac{2}{3} &= -\frac{11}{6} + \frac{2}{3} \\ &= -\frac{11}{6} + \frac{2}{3} \cdot \frac{2}{2} \\ &= -\frac{11}{6} + \frac{4}{6} \\ &= -\frac{7}{6} \checkmark\end{aligned}$$

The solution is  $-\frac{11}{6}$ .

6. Solve and check  $-3m - 5 + 4m = 9$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned} -3m - 5 + 4m &= 9 \\ m - 5 &= 9 \\ m - 5 + 5 &= 9 + 5 \\ m &= 14 \end{aligned}$$

$$\begin{aligned} \text{Check: } m &= 14 \\ -3m - 5 + 4m &= 9 \\ -3(14) - 5 + 4(14) &\stackrel{?}{=} 9 \\ -42 - 5 + 56 &\stackrel{?}{=} 9 \\ -47 + 56 &\stackrel{?}{=} 9 \\ 9 &= 9 \end{aligned}$$

The solution is 14.

7. Solve and check  $\frac{w}{3} = 12$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned} \frac{w}{3} &= 12 \\ 3 \cdot \frac{w}{3} &= 3 \cdot 12 \\ w &= 36 \end{aligned}$$

$$\begin{aligned} \text{Check: If } w &= 36, \\ \text{then } \frac{w}{3} &= \frac{36}{3} \\ &= 12 \checkmark \end{aligned}$$

The solution is 36.

8. Solve and check  $-4y = 24$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$-4y = 24$$

$$\frac{-4y}{-4} = \frac{24}{-4}$$

$$y = -6$$

Check: If  $y = -6$ ,  
then  $-4y = -4(-6)$   
 $= 24 \checkmark$

The solution is  $-6$ .

9. Solve and check  $20 = -\frac{5}{8}a$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$20 = -\frac{5}{8}a$$

$$-\frac{8}{5}(20) = -\frac{8}{5}\left(-\frac{5}{8}a\right)$$

$$-\frac{160}{5} = a$$

$$-32 = a$$

Check: If  $a = -32$ ,  
then  $-\frac{5}{8}a = -\frac{5}{8}(-32)$   
 $= \frac{160}{8}$   
 $= 20 \checkmark$

The solution is  $-32$

10. Solve and check  $8x - 3x = -45$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$8x - 3x = -45$$

$$5x = -45$$

$$\frac{5x}{5} = \frac{-45}{5}$$

$$x = -9$$

check: If  $x = -9$ ,  
then  $8x - 3x = 8(-9) - 3(-9)$   
 $= -72 + 27$   
 $= -45$

The solution is  $-9$ .

11. Solve and check  $-3y + 4 = 13$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$-3y + 4 = 13$$

$$-3y + 4 - 4 = 13 - 4$$

$$-3y = 9$$

$$\frac{-3y}{-3} = \frac{9}{-3}$$

$$y = -3$$

Check: If  $y = -3$ ,  
then  $-3y + 4 = -3(-3) + 4$   
 $= 9 + 4$   
 $= 13 \checkmark$

The solution is  $-3$ .

12. Solve and check  $6z - 3 = z + 2$ . Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned}6z - 3 &= z + 2 \\6z - 3 - z &= z + 2 - z \\5z - 3 &= 2 \\5z - 3 + 3 &= 2 + 3 \\5z &= 5 \\\frac{5z}{5} &= \frac{5}{5} \\z &= 1\end{aligned}$$

$$\begin{aligned}\text{Check: } z &= 1 \\6z - 3 &= z + 2 \\6(1) - 3 &= 1 + 2 \\6 - 3 &= 3 \\3 &= 3 \checkmark\end{aligned}$$

The solution is 1.

13. Solve  $7x + 3 = 6(x - 1) + 9$ . Show all of your work. Write your answer in a complete sentence.

$$\begin{aligned}7x + 3 &= 6(x - 1) + 9 \\7x + 3 &= 6x - 6 + 9 \\7x + 3 &= 6x + 3 \\7x + 3 - 6x &= 6x + 3 - 6x \\x + 3 &= 3 \\x + 3 - 3 &= 3 - 3 \\x &= 0\end{aligned}$$

$$\begin{aligned}\text{Check: } x &= 0 \\7x + 3 &= 6(x - 1) + 9 \\7(0) + 3 &= 6(0 - 1) + 9 \\0 + 3 &= 6(-1) + 9 \\3 &= -6 + 9 \\3 &= 3 \checkmark\end{aligned}$$

The solution is 0.