

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

1. Solve for x and fill in the reasons for each step.

$\frac{1}{5}[10 - 5(x - 2)] = \frac{1}{10}(x + 1)$	Original statement
$2[10 - 5(x - 2)] = (x + 1)$	Multiply both sides by <u>10</u> .
$2[10 - 5x + 10] = (x + 1)$	Distribute the 5
$2[20 - 5x] = (x + 1)$	Combine like terms
$40 - 10x = x + 1$	Distribute the 2
$40 = 11x + 1$	Addition Property of Equality
$39 = 11x$	Subtraction Property of Equality
$\frac{39}{11} = x$	Division Property of Equality.

Solve each equation for x . Be sure to show each step, but you do not need to give a reason for each one.

<p>2. $x + 6 - x = 2x + 10$</p> $\begin{array}{r} 6 \neq 2x + 10 \\ -10 \quad \quad -10 \\ \hline -4 = 2x \\ \frac{-4}{2} = \frac{2x}{2} \\ -2 = x \end{array}$ <p style="text-align: center;">-2 = x</p>	<p>3. $15 = \frac{3}{5}x$</p> $\frac{5}{3} \left(\frac{15}{5} \right) = \left(\frac{3}{5}x \right) \frac{5}{3}$ <p style="text-align: center;">25 = x</p>	<p>4. $5(x + 5) = 10$</p> $\begin{array}{r} 5x + 25 \neq 10 \\ -25 \quad \quad -25 \\ \hline 5x = -15 \\ \frac{5x}{5} = \frac{-15}{5} \\ x = -3 \end{array}$ <p style="text-align: center;">x = -3</p>
<p>5. $x + 11 + x = -7$</p> $\begin{array}{r} 2x + 11 \neq -7 \\ -11 \quad \quad -11 \\ \hline 2x = -18 \\ \frac{2x}{2} = \frac{-18}{2} \\ x = -9 \end{array}$ <p style="text-align: center;">x = -9</p>	<p>6. $2x + 7 = 4x - 9$</p> $\begin{array}{r} 2x + 7 \neq 4x - 9 \\ -2x \quad \quad -2x \\ \hline 7 \neq 2x - 9 \\ +9 \quad \quad +9 \\ \hline 16 = 2x \\ \frac{16}{2} = \frac{2x}{2} \\ 8 = x \end{array}$ <p style="text-align: center;">8 = x</p>	<p>7. $5x + 4 = 4x + 4$</p> $\begin{array}{r} 5x + 4 \neq 4x + 4 \\ -4x \quad \quad -4x \\ \hline x + 4 \neq 4 \\ -4 \quad \quad -4 \\ \hline x = 0 \end{array}$ <p style="text-align: center;">x = 0</p>
<p>8. $9(x + 4) = 9x + 4$</p> $\begin{array}{r} 9x + 36 \neq 9x + 4 \\ -9x \quad \quad -9x \\ \hline 36 \neq 4 \end{array}$ <p style="text-align: center;">NO SOLUTION</p>	<p>9. $3x - 7 + 5 = 2(x - 2)$</p> $\begin{array}{r} 3x - 2 \neq 2x - 4 \\ -2x \quad \quad -2x \\ \hline x - 2 \neq -4 \\ +2 \quad \quad +2 \\ \hline x = -2 \end{array}$ <p style="text-align: center;">x = -2</p>	<p>10. $2x + 9 + x = 3(x - 2) + 15$</p> $\begin{array}{r} 3x + 9 = 3x - 6 + 15 \\ 3x + 9 \neq 3x + 9 \\ -3x \quad \quad -3x \\ \hline 9 = 9 \checkmark \end{array}$ <p style="text-align: center;">ALL REAL NUMBERS OR Infinite Solutions</p>

Solve each equation for x .

11. $7x - [4x - 3(x - 1)] = x + 12$

$$7x - [4x - 3x + 3] = x + 12$$

$$7x - [x + 3] = x + 12$$

$$7x - x - 3 = x + 12$$

$$\begin{array}{r} 6x - 3 = x + 12 \\ -x \quad -x \end{array}$$

$$\begin{array}{r} 5x - 3 = 12 \\ +3 \quad +3 \end{array}$$

$$5x = 15$$

$$\boxed{x = 3}$$

12. $2[2(3 - 5x) + 4] = 5[2(3 - 3x) + 2]$

$$2[6 - 10x + 4] = 5[6 - 6x + 2]$$

$$2[-10x + 10] = 5[-6x + 8]$$

$$-20x + 20 = -30x + 40$$

$$10x + 20 = 40$$

$$10x = 20$$

$$\boxed{x = 2}$$

13. $\frac{1}{2}(18 - 5x) = \frac{1}{3}(6 - 4x)$

$$\text{LCD: } 6 \quad \begin{array}{l} 3 \\ 2 \end{array} \left(\frac{1}{2}(18 - 5x) \right) = \begin{array}{l} 2 \\ 3 \end{array} \left(\frac{1}{3}(6 - 4x) \right)$$

$$3(18 - 5x) = 2(6 - 4x)$$

$$54 - 15x = 12 - 8x$$

$$54 = 12 + 7x$$

$$42 = 7x$$

$$\boxed{6 = x}$$

14. $18 = \frac{2}{3}x$

$$\frac{3}{2} \cdot 18 = \frac{2}{3}x \cdot \frac{3}{2}$$

$$\boxed{27 = x}$$

15. **Challenge** Write an equation that has no solution.

Answers will vary.

$$\underline{7x + 5} = \underline{7x - 8}$$

* variables are the same & will cancel each other out

* Constants different

REVIEW—Evaluate Formulas

For each formula, substitute the given value and simplify.

16. Velocity: $v = \frac{d}{t}$

If $d = 50$ miles and $t = 2$ hours, what is the velocity, v ? Be sure to include units in your answer.

$$v = \frac{d}{t} \rightarrow v = \frac{50 \text{ miles}}{2 \text{ hour}} \rightarrow v = 25 \text{ miles/hour}$$

17. Density: $\rho = \frac{m}{V}$

If the mass, m , is 50 kg and the volume, V , is 25 cubic centimeters, cm^3 , what is the density, ρ ?

$$\rho = \frac{m}{V} \rightarrow \rho = \frac{50 \text{ kg}}{25 \text{ cm}^3} \rightarrow \rho = 2 \text{ kg/cm}^3$$

18. Acceleration: $a = \frac{V_f - V_i}{t}$

If the final velocity, V_f , is 20 m/s^2 , the initial velocity, V_i , is 10 m/s^2 and the time, t , in which the change occurs is 5 seconds, what is the acceleration?

$$a = \frac{V_f - V_i}{t} \rightarrow a = \frac{20 \text{ m/s}^2 - 10 \text{ m/s}^2}{5 \text{ seconds}} \rightarrow a = \frac{10 \text{ m}}{5 \text{ s}} \rightarrow a = 2 \text{ m/s}^3$$

19. Momentum: $p = mv$

If the mass, m , is 10 kg and the velocity, V , is 10 m/s^2 , what is the momentum, p ?

$$p = mv \rightarrow p = (10 \text{ kg})(10 \text{ m/s}^2) = p = 100 \text{ kg} \cdot \text{m/s}$$