

Warm-up
Solve using mental math.

1.) $x + 2 = 17$
 $-2 -2$
 $x = 15$

2.) $\frac{x}{6} = 4$
 $\cdot 6 \cdot 6$
 $x = 24$

3.) $x - 7 = 3$
 $+7 +7$
 $x = 10$

4.) $9x = 54$
 $\div 9 \div 9$
 $x = 6$

Vocabulary	
Inverse Operations	Two operations that undo each other, like mult and div. or add. + sub.
Properties of Equality	Properties that allow you to do something to both sides of an equation and keep the equation balanced.
Distributive Property	Property that says that $5(x+5) = 5x+25$

When solving equations, we may have to use a variety of properties & inverse operations! Here are a few suggestions:

- Use the distributive property when the situation arises and combine like terms on each side of the equation.
- When fractions are present, multiply both sides by the denominator like working with fractions!
- Your goal is to isolate the variable, so unwrap the equation by using inverse operations!

1.) $9x + x - 7 = 13$

$10x - 7 = 13$
 $+7 +7$
 $10x = 20$
 $\div 10 \div 10$
 $x = 2$

$$2.) \quad 4x - 7(x - 2) = 26$$

$$4x - 7x + 14 = 26$$

$$\begin{array}{r} -3x + 14 = 26 \\ -14 \quad -14 \\ \hline -3x = 12 \\ \div -3 \quad \div -3 \\ \hline x = -4 \end{array}$$

$$3.) \quad \frac{3}{5}(2x - 4) = 14$$

$$\frac{5}{3} \left(\frac{6x}{5} - \frac{12}{5} \right) = 14 \cdot \frac{5}{3}$$

$$\frac{30x}{5} - \frac{60}{5} = 70$$

$$6x - 12 = 70$$

$$\begin{array}{r} 6x - 12 = 70 \\ +12 \quad +12 \\ \hline 6x = 82 \\ \div 6 \quad \div 6 \\ \hline x = \frac{82}{6} \end{array}$$

$$x = \frac{41}{3}$$

$$4.) \quad 9d - 2d + 4 = 32$$

$$\begin{array}{r} 7d + 4 = 32 \\ -4 \quad -4 \\ \hline 7d = 28 \\ \div 7 \quad \div 7 \\ \hline d = 4 \end{array}$$

$$5.) \quad 2w - 3(4 + w) = 27$$

$$2w - 12 - 3w = 27$$

$$\begin{array}{r} -1w - 12 = 27 \\ +12 \quad +12 \\ \hline -1w = 39 \\ \div -1 \quad \div -1 \\ \hline w = -39 \end{array}$$

$$6.) \quad 6x - \frac{2}{3}(x-5) = 46$$

$$\frac{3}{1} \left(6x - \frac{2x}{3} + \frac{10}{3} \right) = 46 \cdot 3$$

$$18x - \frac{6x}{3} + \frac{30}{3} = 138$$

$$18x - 2x + 10 = 138$$

$$16x + 10 = 138$$

$$-10 \quad -10$$

$$\frac{16x}{16} = \frac{128}{16}$$

$$x = 8$$