2.1 & 2.2 Solving Equations

(Get the variable on a side by itself)

If there are addition or subtraction signs, add opposite to both sides of equation to get the variable term by itself.

1. \( x + 6 = 9 \)
   
   Add \((-6)\):
   
   \[
   \begin{align*}
   x + 6 & = 9 \\
   \downarrow & \quad \downarrow \\
   x & = 3
   \end{align*}
   \]

2. \( x - 3 = 8 \)

3. \( 4 + x = -8 \)

4. \( -5 = x + 8 \)

5. \( 3 + t = 21 \)

6. \( -19 = -47 + y \)

If there is a coefficient (number) on the variable, divide both sides of the equation by that coefficient (number) to get the variable by itself.

1. \( \frac{2x}{2} = \frac{6}{2} \)

   Divide by 2:
   
   \[
   \begin{align*}
   \frac{2x}{2} & = \frac{6}{2} \\
   x & = 3
   \end{align*}
   \]

2. \( 3x = -9 \)

3. \( -4x = -16 \)

4. \( -8x = 4 \)

5. \( -20 = -5w \)

6. \( 18 = -9m \)

7. \( -x = -18 \)

8. \( -15 = -w \)

9. \( 11 = -2m \)
Mixed Practice. Solve these equations by using the two steps:

1. If there are addition or subtraction **signs**, add opposite to both sides of equation to get the variable term by itself.
2. If there is a **coefficient** (number) on the variable, divide both sides of the equation by that coefficient (number).

**ADD OPPOSITE TO GET RID OF SIGN; DIVIDE BY SAME NUMBER TO GET RID OF COEFFICIENT.**

1. \[3x + 5 = 17\]  
   Add \((-5)\) 
   \[3x = 12\]  
   Divide by 3 
   \[x = 4\]

2. \[45 - t = 10\]  
3. \[4x + 5 = -2\]

4. \[-5x - 6 = 16\]  
5. \[8 = 4 - 2x\]  
6. \[-91 = 9 + 3t\]

7. \[3m - 4 = 11\]  
8. \[-1 = 5 - 3t\]  
9. \[4 = 5m + 8\]

**Combining like terms.** If like terms occur on the same side of the equation, combine the before you use the two steps.

1. \[3x + 4x = -14\]  
   **combine terms** \[7x = -14\]  
   **divide by 7** \[x = -2\]

2. \[-10y - 3y = -13\]

3. \[4y = 5 - (-12)\]

4. \[4 + 3x - 6 = 4\]  
5. \[2 = 3x + 5x - 2\]  
6. \[-4x + 2x + 1 = -9\]