3.1 Solving Two-Step Equations

Goal: Solve two-step equations.

Example 1 — *Using Subtraction and Division to Solve*

Solve $4x + 9 = -7$. Check your solution.

Notice in Example 1 that you isolate x by working backward. First you subtract from each side and then you divide.

$4x + 9 = -7$	Write original equation.
$4x + 9 - \boxed{} = -7 - \boxed{}$	Subtract $\boxed{}$ from each side.
$4x = \boxed{}$	Simplify.
$\dfrac{4x}{\boxed{}} = \dfrac{-16}{\boxed{}}$	Divide each side by $\boxed{}$.
$x = \boxed{}$	Simplify.

Answer: The solution is $\boxed{}$.

Check:

$4x + 9 = -7$	Write original equation.
$4\left(\boxed{}\right) + 9 \overset{?}{=} -7$	Substitute for x.
$\boxed{}\boxed{} -7$ $\boxed{}$.	

✔ **Checkpoint** Solve the equation. Check your solution.

1. $3x + 8 = 26$	**2.** $-21 = 4x + 7$

Example 2 *Using Addition and Multiplication to Solve*

Solve $\frac{x}{3} - 4 = -1$. **Check your solution.**

$$\frac{x}{3} - 4 = -1 \qquad \text{Write original equation.}$$

$$\frac{x}{3} - 4 + \boxed{} = -1 + \boxed{} \qquad \text{Add } \boxed{} \text{ to each side.}$$

$$\frac{x}{3} = \boxed{} \qquad \text{Simplify.}$$

$$\boxed{}\left(\frac{x}{3}\right) = \boxed{}\left(\boxed{}\right) \qquad \text{Multiply each side by } \boxed{}.$$

$$x = \boxed{} \qquad \text{Simplify.}$$

Answer: The solution is $\boxed{}$.

Check: $\quad \frac{x}{3} - 4 = -1 \qquad$ Write original equation.

$$\frac{\boxed{}}{3} - 4 \stackrel{?}{=} -1 \qquad \text{Substitute for } x.$$

$$\boxed{}\boxed{} -1 \qquad \boxed{}.$$

✔ *Checkpoint* **Solve the equation. Check your solution.**

3. $\dfrac{x}{4} - 7 = 2$	**4.** $8 = \dfrac{b}{5} - 3$

Example 3 — *Solving an Equation with Negative Coefficients*

Solve 2 − 3x = 17. Check your solution.

$2 - 3x = 17$	Write original equation.
$2 - 3x - \boxed{} = 17 - \boxed{}$	Subtract $\boxed{}$ from each side.
$-3x = \boxed{}$	Simplify.
$\dfrac{-3x}{\boxed{}} = \dfrac{15}{\boxed{}}$	Divide each side by $\boxed{}$.
$x = \boxed{}$	Simplify.

Answer: The solution is $\boxed{}$.

Check:

$2 - 3x = 17$	Write original equation.
$2 - 3\left(\boxed{}\right) \stackrel{?}{=} 17$	Substitute for *x*.
$\boxed{}\ \boxed{}\ 17$ $\boxed{}$.	

✔ ***Checkpoint*** **Solve the equation. Check your solution.**

5. $3 - 2y = 19$	**6.** $-5 = 4 - m$