

# **SOLVING EQUATIONS**

For each equation, state whether there is *no solution*, *one solution*, or *infinitely many solutions*. Explain your reasoning.

$$3x - 6 = 3(x - 1) - 3$$

$$3x - 6 = 3(x - 1) - 3$$

$$3x - 6 = 3x - 3 - 3$$

$$3x - 6 = 3x - 6$$

**Infinitely many solutions**  
**because the terms on each**  
**side of the equation has the**  
**same.**

$$2x + 7 = -2x + 7$$

$$2x + 7 = -2x + 7$$
$$+ \underline{2x} \qquad \qquad \qquad + \underline{2x}$$

$$4x + 7 = 7$$

$$- 7 = -7$$

$$\underline{4x} = \underline{0}$$

$$4 = 4$$

$$x = 0$$

**There is one solution**

$$2x + 7 = 2x$$

$$\begin{array}{r} 2x + 7 = 2x \\ \underline{-2x} \qquad \qquad \underline{-2x} \\ 7 \neq 0 \end{array}$$

**There is no solution**

Solve the equation. Show all your work neatly and logically.

$$\frac{2}{3}x - 4\frac{1}{2} = -8$$

**Multiply by the common denominator, 6, to eliminate the fractions.**

$$(6)\frac{2}{3}x - (6)\left(\frac{9}{2}\right) = (6)(-8)$$

$$4x - 27 = -48$$

$$\underline{+ 27 = + 27}$$

$$\underline{4x = 21}$$

$$4 \quad 4$$

$$x = \frac{21}{4}$$

**There is one solution**

Solve the equation. Show all your work neatly and logically.

$$-3.5(10x - 2) = -176.75$$

$$3.5(10x - 2) = -176.75$$

$$35x - 70 = -176.75$$

$$\begin{array}{r} \phantom{35x} + 70 = +70 \\ \hline \underline{35x} = \underline{-106.75} \\ 35 \qquad \qquad 35 \end{array}$$

$$x = 3.05$$

Solve the equation. Show all your work neatly and logically.

$$-4(2x + 9) + 3x = 6 - 4(x - 3)$$



$$\begin{aligned} -4(2x + 9) + 3x &= 6 - 4(x - 3) \\ -8x - 36 + 3x &= 6 - 24x + 12 \\ -5x - 36 &= 18 - 24x \\ \quad \quad \quad + 36 &= +36 \\ -5x &= 54 - 24x \\ +24x &= +24x \\ \hline \underline{19x} &= \underline{54} \\ 19 &= 19 \\ \mathbf{x} &= \frac{54}{19} \end{aligned}$$