

Lesson 3-2

Example 1 Solve by Adding a Positive Number

Solve $y - 12 = -21$. Then check your solution.

$$\begin{array}{ll} y - 12 = -21 & \text{Original equation} \\ y - 12 + 12 = -21 + 12 & \text{Add 12 to each side.} \\ y = -9 & -12 + 12 = 0 \text{ and } -21 + 12 = -9. \end{array}$$

To check that -9 is the solution, substitute -9 for y in the original equation.

$$\begin{array}{ll} \text{Check } y - 12 = -21 & \text{Original equation} \\ -9 - 12 = -21 & \text{Substitute } -9 \text{ for } y. \\ -21 = -21 & \text{Subtract.} \end{array}$$

The solution is -9 .

Example 2 Solve by Adding a Negative Number

Solve $27 - p = 13$. Then check your solution.

$$\begin{array}{ll} 27 - p = 13 & \text{Original equation} \\ 27 + (-p) + (-27) = 13 + (-27) & \text{Add } -27 \text{ to each side.} \\ -p = -14 & 27 + (-27) = 0 \text{ and } 13 + (-27) = -14. \\ p = 14 & \text{Multiply both sides by } -1. \end{array}$$

$$\begin{array}{ll} \text{Check } 27 - p = 13 & \text{Original equation} \\ 27 - 14 = 13 & \text{Substitute } -14 \text{ for } p. \\ 13 = 13 & \text{Add.} \end{array}$$

The solution is -14 .

Example 3 Solve by Subtracting

Solve $k + \frac{4}{5} = -\frac{1}{3}$. Then check your solution.

$$\begin{array}{ll} k + \frac{4}{5} = -\frac{1}{3} & \text{Original equation} \\ k + \frac{4}{5} - \frac{4}{5} = -\frac{1}{3} - \frac{4}{5} & \text{Subtract } \frac{4}{5} \text{ from each side.} \\ k = -\frac{17}{15} & \frac{4}{5} - \frac{4}{5} = 0 \text{ and } -\frac{1}{3} - \frac{4}{5} = -\frac{17}{15}. \end{array}$$

$$\begin{array}{ll} \text{Check } k + \frac{4}{5} = -\frac{1}{3} & \text{Original equation} \\ -\frac{17}{15} + \frac{4}{5} = -\frac{1}{3} & \text{Substitute } -\frac{17}{15} \text{ for } k. \\ -\frac{1}{3} = -\frac{1}{3} & \text{Add.} \end{array}$$

The solution is $-\frac{17}{15}$.

Example 4 Solve by Adding or SubtractingSolve $m + 4.65 = -3.82$ in two ways.**Method 1** Use the Subtraction Property of Equality.

$$\begin{array}{ll}
 m + 4.65 = -3.82 & \text{Original equation} \\
 m + 4.65 - 4.65 = -3.82 - 4.65 & \text{Subtract 4.65 from each side.} \\
 m = -8.47 & 4.65 - 4.65 = 0 \text{ and } -3.82 - 4.65 = -8.47.
 \end{array}$$

The solution is -8.47 .**Method 2** Use the Addition Property of Equality.

$$\begin{array}{ll}
 m + 4.65 = -3.82 & \text{Original equation} \\
 m + 4.65 + (-4.65) = -3.82 + (-4.65) & \text{Add } -4.65 \text{ to each side.} \\
 m = -8.47 & 4.65 + (-4.65) = 0 \text{ and } -3.82 + (-4.65) = -8.47.
 \end{array}$$

The solution is -8.47 .**Example 5 Write and Solve an Equation****Write an equation for the problem. Then solve the equation and check your solution.**

The difference of a number and one fourth is negative two thirds.

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$$\underbrace{\text{a number}}_n \quad \underbrace{\text{the difference of}}_{} \quad \underbrace{\text{one fourth}}_{\frac{1}{4}} \quad \underbrace{\text{is}}_{} \quad \underbrace{\text{negative two thirds}}_{-\frac{2}{3}}$$

$$n - \frac{1}{4} = -\frac{2}{3}$$

Original equation

$$n - \frac{1}{4} + \frac{1}{4} = -\frac{2}{3} + \frac{1}{4}$$

Add $\frac{1}{4}$ to each side.

$$n = -\frac{5}{12} \quad -\frac{1}{4} + \frac{1}{4} = 0 \text{ and } -\frac{2}{3} + \frac{1}{4} = -\frac{5}{12}$$

Check

$$\begin{array}{l}
 n - \frac{1}{4} = -\frac{2}{3} \\
 -\frac{5}{12} - \frac{1}{4} = -\frac{2}{3} \\
 -\frac{2}{3} = -\frac{2}{3}
 \end{array}$$

Original equation

Substitute $-\frac{5}{12}$ for n .The solution is $-\frac{5}{12}$.

Example 6 Write an Equation to Solve a Problem

Noah received a paycheck on Friday. After buying some athletic shoes for \$112, he had \$96 left. How much was his paycheck?

Words The amount of the paycheck minus the amount of the shoes equals \$96.

Variable Let a = amount of paycheck

Equation alg1_030206.gif

The original amount	minus	the amount for shoes	equals	\$96
a	-	112	=	96
$a - 112 = 96$				
$a - 112 + 112 = 96 + 112$				
$a = 208$				

Original equation
Add 112 to each side.
-112 + 112 = 0 and 96 + 112 = 208.

Noah's paycheck was for \$208.