

## Solving Two-Step Equations

## Examples

(A) 
$$\begin{array}{r} 3x + 1 = 7 \\ \underline{-1 \quad -1} \end{array}$$
 inverse operation (addition or subtraction)

$$3x = 6$$

$$\frac{3x}{3} = \frac{6}{3}$$

Eliminate the coefficient of  $x$

divide each side by 3

$$x = 2$$

Check your answer.

Use the original equation

$$3x + 1 = 7$$

$$3(2) + 1 = 7$$

$$6 + 1 = 7$$

$$7 = 7 \quad \checkmark$$

Substitute 2 for  $x$

True statement

so  $x = 2$  is

the solution

## Example B

B

$$3(y+5) = 21$$

$$3(y) + 3(5) = 21$$

Distributive Property

$$3y + 15 = 21$$

Simplify

$$\begin{array}{r} -15 \quad -15 \\ \hline 3y + 15 = 21 \end{array}$$

inverse operation

$$3y + 0 = 6$$

$$3y = 6$$

$$\frac{3y}{3} = \frac{6}{3}$$

Eliminate the coefficient

$$y = 2$$

Check your solution

$$3(y+5) = 21$$

Use original equation

$$3(2+5) = 21$$

Substitute 2 for y

$$3(7) = 21$$

$$21 = 21 \quad \checkmark$$

True statement

## Example

$$C \quad 16 - \frac{r}{7} = 21$$

$$\begin{array}{r} -16 \qquad \qquad \qquad -16 \\ \hline \end{array}$$

$$-\frac{r}{7} = 5$$

Inverse operation  
(subtraction or addition)

inverse operation  
(multiply or divide)

$$\left(-\frac{7}{1}\right)\left(-\frac{r}{7}\right) = 5(-7)$$

$$+r = -35$$

Check

$$16 - \frac{r}{7} = 21$$

$$16 - \frac{(-35)}{7} = 21$$

$$16 - (-5) = 21$$

$$16 + 5 = 21$$

$$21 = 21 \checkmark$$

True

## Example

D.

$$\frac{(10+x)}{-8} = \frac{-3}{1}$$

Cross products

$$1(10+x) = -3(-8)$$

distributive property

$$\frac{10+x}{-10} = \frac{24}{-10}$$

inverse operation

$$x = 14$$

solution

Check

$$\frac{10+x}{-8} = -3$$

$$\frac{10+14}{-8} = -3$$

$$\frac{24}{-8} = -3$$

$$-3 = -3 \quad \text{True}$$

## Example

III,

$$\frac{a-4}{3} = -7$$

~~$$\frac{a-4}{3} = \frac{-7}{1}$$~~

Cross products

$$1(a-4) = 3(-7)$$

distributive property

$$\begin{array}{r} a-4 = -21 \\ +4 \quad +4 \end{array}$$

Inverse Operation  
(addition or subtraction)

$$\boxed{a = -17}$$

solution

Check

$$\frac{a-4}{3} = -7$$

$$\frac{-17-4}{3} = -7$$

$$\frac{-21}{3} = -7$$

$$-7 = -7 \checkmark \quad \text{True statement}$$

thus  $a = -17$  solution

## Solving Two-Step Equations (SOL 7.14)

### Example 1 Solve $3x + 1 = 7$

### CHECK

$$3x + 1 = 7$$

Locate the variable term.

$$3x + 1 = 7$$

$$3x + 1 = 7$$

Use **INVERSE OPERATIONS** to isolate the  $x$  term.

$$3(\underline{\quad}) + 1 \stackrel{?}{=} 7$$

$$\underline{-1} \quad \underline{-1}$$

In **Reverse PEMDAS** order

$$3x = \underline{\quad}$$

Simplify.

$$\underline{\quad} + 1 \stackrel{?}{=} 7$$

$$\frac{3x}{\square} = \frac{6}{\square}$$

To eliminate the coefficient divide each side by  $\underline{\quad}$ .

$$\underline{\quad} = 7 \quad \checkmark$$

$$x = \underline{\quad}$$

Simplify.

Solve the two-step equation. Check your solution.

Show your work and check your answers.

<p>A. <math>\frac{r}{4} - 12 = -5</math></p>	<p>B. <math>7k - 14 = 42</math></p>	<p>C. <math>-12 = 24 + 4b</math></p>
<p>D. <math>3g - 5 = 17</math></p>	<p>E. <math>9 = 4a + 13</math></p>	<p>F. <math>13 = 5m - 2</math></p>
<p>G. <math>-5 + 7k = -19</math></p>	<p>H. <math>-15 = 11 - 2t</math></p>	<p>I. <math>13 = 11 - 4x</math></p>

## Thumper WS

<p>J. <math>10 = \frac{s}{2} + 7</math></p>	<p>K. <math>6 + \frac{n}{5} = -4</math></p>	<p>L. <math>4 - 3y = 31</math></p>
<p>M. <math>15 - 2b = -9</math></p>	<p>N. <math>-\frac{1}{3}y - 6 = -11</math></p>	<p>O. <math>16 - \frac{r}{7} = 21</math></p>
<p>P. <math>3(y + 5) = 21</math></p>	<p>Q. <math>7(p - 3) = 35</math></p>	<p>R. <math>-48 = 6(v + 2)</math></p>
<p>S. <math>\frac{x + 3}{2} = 5</math></p>	<p>T. <math>\frac{a - 4}{3} = -7</math></p>	<p>U. <math>\frac{k + 1}{-2} = -8</math></p>
<p>V. <math>7 - 2y = -3</math></p>	<p>W. <math>\frac{4 - x}{3} = -7</math></p>	<p>X. <math>15 = -3(w - 2)</math></p>