

Concept: Solving Two-Step Equations

Name: _____

COMPUTER COMPONENT

Instructions: In follow the **Content Menu** path:
Equations > Solving Two-Step Equations

Work through all Sub Lessons of the following Lessons **in order**:

- *Our Problem*
- *Examples With Tiles*
- *Examples Without tiles*

Additional Required Materials: *Pencil Crayons (red and blue)*

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

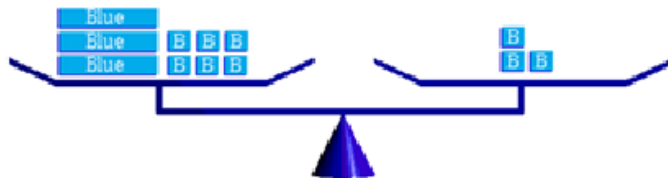
NOTES:

Remember:

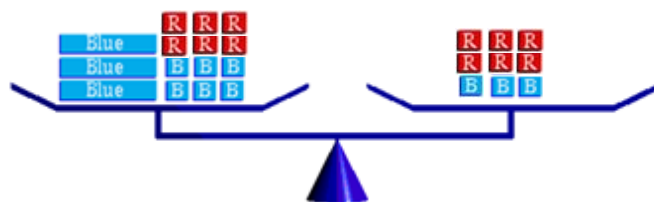
Tile	Represents
Blue Tile	<i>1</i>
Red Tile	<i>-1</i>
+	<i>1-1</i> or <i>0</i>

Solve the following examples with tiles as you fill in the blanks and keep the balance balanced:

Step 1 $3x + 6 = 3$



Step 2 $3x + 6 - 6 = 3 - 6$



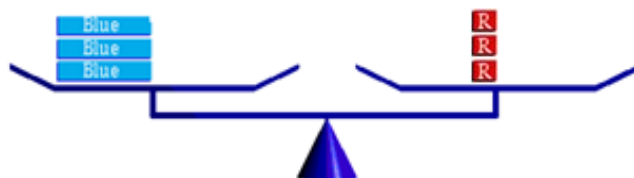
Isolate the x tile

Hint: Draw the appropriate number of red tiles (-1) over the blue tiles ($+1$).

Remember to keep the balance balanced.

Simplify

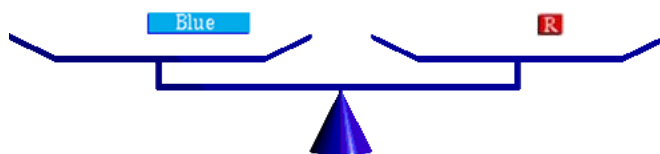
$3x = -3$



Simplify

Remember to keep the balance balanced.

Step 3 $\div 3$) $\frac{3x}{3} = \frac{-3}{3}$



$\therefore x = -1$

Rearrange each side into 3 equal groups.

divide each side by 3.

Of the four examples with tiles, pick the one that you felt was the most difficult and model the steps:

(Answers will vary)

Circle the step(s) that was (were) the most difficult and explain why it was (they were) complicated.

(Answers will vary)

Without Tiles

Fill in the blanks

 Step 1: Rewrite the equation.

 Step 2: Isolate the x term.

(Hint: Think of balancing the balance)

- Perform the same operation on both sides of the equation.
- Determine which operation; (+), (-), (×), or (÷) should be applied to both sides.

 Step 3: Simplify

 Step 4: Isolate the x variable

(Hint: Keep the balance balanced)

- Perform the same operation on both sides of the equation.
- Determine which operation; (×) or (÷) should be applied to both sides.

 Step 5: Simplify

 Step 6: Check your answer in the original equation.

Example:

Solve for x (*fill in the blanks*)

Step 1: $7x + 9 = 51$

Step 2: **-9)** $7x + 9 - 9 = 51 - 9$

Step 3: Simplify $7x = 42$

Step 4: **÷7)** $\frac{7x}{7} = \frac{42}{7}$

Step 5: Simplify $x = 6$

Step 6: Check

Left Side	=	$7x + 9$
	=	$7(6) + 9$
	=	$42 + 9$
	=	51

Right Side = **51**

L.S. = R.S., the solution $x = 6$ is correct.

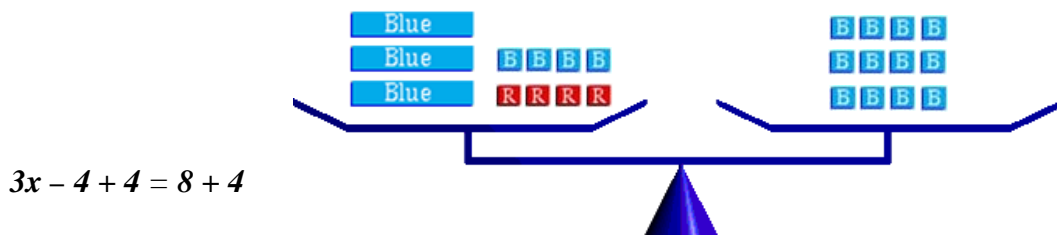
COMPUTER EXERCISES

 1. Given the equation $3x - 4 = 8$

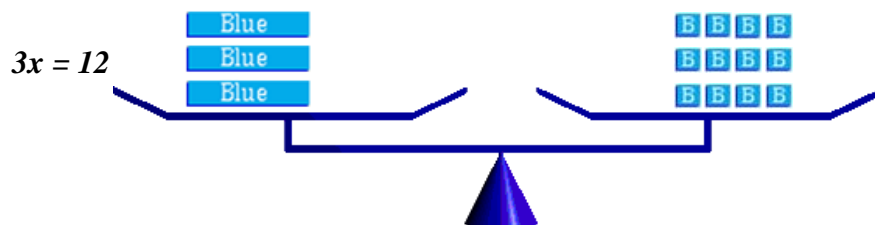
(a) Represent the equation on the balance by using tiles.



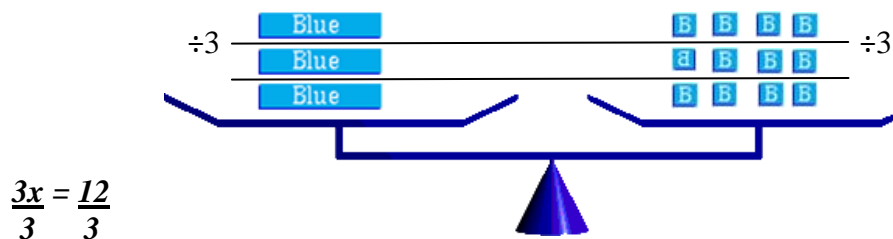
(b) Isolate the x tile by manipulating the tiles.



(c) Write the resulting equation and simplify it.



(d) Isolate the x tile by rearranging the tiles and perform the appropriate operation.



(e) Write the resulting equation and simplify it.



2. Solve each equation $14 = 3x + 2$ in two ways.

With the Balance	Without the Balance
	Write the equation $14 = 3x + 2$
	Subtract 2 from both sides $14 - 2 = 3x + 2 - 2$
	Simplify $12 = 3x$
$\div 3$	Isolate x and divide both sides by 3 $\frac{12}{3} = \frac{3x}{3}$
	Simplify $4 = x$
	Check: $\begin{aligned} L.S. &= 14 & R.S. &= 3x + 2 \\ & & &= 3(4) + 2 \\ & & &= 12 + 2 \\ & & &= 14 \end{aligned}$ <p>$L.S. = R.S.,$ the solution $x = 4$ is correct.</p>

(a) Which method did you prefer? Why?

(Answers will vary)

3. Solve each equation. *Be sure to write out all of your steps and to check each answer.*

$$\begin{aligned}
 \text{(a)} \quad & 2x - 5 = 7 \\
 +5) \quad & 2x - 5 + 5 = 7 + 5 \\
 & 2x = 12 \\
 \div 2) \quad & \frac{2x}{2} = \frac{12}{2} \\
 & x = 6
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. &= 2x - 5 & R.S. &= 7 \\
 &= 2(6) - 5 \\
 &= 12 - 5 \\
 &= 7
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $x = 6$ is the correct solution.

$$\begin{aligned}
 \text{(b)} \quad & -5y + 3 = 8 \\
 -3) \quad & -5y + 3 - 3 = 8 - 3 \\
 & -5y = 5 \\
 (\div(-5)) \quad & \frac{-5y}{-5} = \frac{5}{-5} \\
 & y = -1
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. &= -5y + 3 & R.S. &= 8 \\
 &= -5(-1) + 3 \\
 &= 5 + 3 \\
 &= 8
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $y = -1$ is the correct solution.

$$\begin{aligned}
 \text{(c)} \quad & 3z - 7 = 11 \\
 +7) \quad & 3z - 7 + 7 = 11 + 7 \\
 & 3z = 18 \\
 \div 3) \quad & \frac{3z}{3} = \frac{18}{3} \\
 & z = 6
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. &= 3z - 7 & R.S. &= 11 \\
 &= 3(6) - 7 \\
 &= 18 - 7 \\
 &= 11
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $z = 6$ is the correct solution.

$$\begin{aligned}
 \text{(d)} \quad & 25 = 2m + 5 \\
 -5) \quad & 25 - 5 = 2m + 5 - 5 \\
 & 20 = 2m \\
 \div 2) \quad & \frac{20}{2} = \frac{2m}{2} \\
 & 10 = m
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. &= 25 & R.S. &= 2m + 5 \\
 & & &= 2(10) + 5 \\
 & & &= 20 + 5 \\
 & & &= 25
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $m = 10$ is the correct solution.

$$\begin{aligned}
 \text{(e)} \quad & 3 = 2a + 7 \\
 -7) \quad & 3 - 7 = 2a + 7 - 7 \\
 & -4 = 2a \\
 \div 2) \quad & \frac{-4}{2} = \frac{2a}{2} \\
 & -2 = a
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. = 3 \quad R.S. &= 2a + 7 \\
 &= 2(-2) + 7 \\
 &= -4 + 7 \\
 &= 3
 \end{aligned}$$

$$L.S. = R.S$$

Therefore $a = -2$ is the correct solution.

$$\begin{aligned}
 \text{(f)} \quad & 0.9x - 0.4 = 3.2 \\
 +0.4) \quad & 0.9x - 0.4 + 0.4 = 3.2 + 0.4 \\
 & 0.9x = 3.6 \\
 \div 0.9) \quad & \frac{0.9x}{0.9} = \frac{3.6}{0.9} \\
 & x = 4
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. = 0.9x - 0.4 \quad R.S. &= 3.2 \\
 &= 0.9(4) - 0.4 \\
 &= 3.6 - 0.4 \\
 &= 3.2
 \end{aligned}$$

$$L.S. = R.S$$

Therefore $x = 4$ is the correct solution.

$$\begin{aligned}
 \text{(g)} \quad & \frac{1}{3}r - 4 = 1 \\
 +4) \quad & \frac{1}{3}r - 4 + 4 = 1 + 4 \\
 & \frac{1}{3}r = 5 \\
 \times 3) \quad & 3 \times \frac{1}{3}r = 5 \times 3 \\
 & r = 15
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. = \frac{1}{3}r - 4 \quad R.S. &= 1 \\
 &= \frac{1}{3}(15) - 4 \\
 &= 5 - 4 \\
 &= 1
 \end{aligned}$$

$$L.S. = R.S$$

Therefore $r = 15$ is the correct solution.

$$\begin{aligned}
 \text{(h)} \quad & \frac{1}{4}m + 2 = 5 \\
 -2) \quad & \frac{1}{4}m + 2 - 2 = 5 - 2 \\
 & \frac{1}{4}m = 3 \\
 \times 4) \quad & 4 \times \frac{1}{4}m = 3 \times 4 \\
 & m = 12
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. = \frac{1}{4}m + 2 \quad R.S. &= 5 \\
 &= \frac{1}{4}(12) + 2 \\
 &= 3 + 2 \\
 &= 5
 \end{aligned}$$

$$L.S. = R.S$$

Therefore $m = 12$ is the correct solution.

$$\begin{aligned}
 \text{(i)} \quad & 0.9x = 9 \\
 \div 0.9) \quad & \frac{0.9x}{0.9} = \frac{9}{0.9} \\
 & x = 10
 \end{aligned}$$

$$\begin{aligned}
 \text{(j)} \quad & 7p - 1 = 34 \\
 +1) \quad & 7p - 1 + 1 = 34 + 1 \\
 & 7p = 35 \\
 \div 7) \quad & \frac{7p}{7} = \frac{35}{7} \\
 & p = 5
 \end{aligned}$$

Check:

$$\begin{aligned}
 L.S. &= 0.9r & R.S. &= 9 \\
 &= 0.9(10) \\
 &= 9
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $x = 10$ is the correct solution.

Check:

$$\begin{aligned}
 L.S. &= 7p - 1 & R.S. &= 34 \\
 &= 7(5) - 1 \\
 &= 35 - 1 \\
 &= 34
 \end{aligned}$$

$$L.S. = R.S.$$

Therefore $p = 5$ is the correct solution.