Understanding Math

Concept: Solving One-Step Equations

Name:

COMPUTER COMPONENT

Instructions: Select the computer program *Understanding Equations* (Neufeld)
Follow the instructions to the Main Menu.
Select *Solving One-Step Equations* from the Main Menu.

Work through all sections of this topic **in order**:

- *Our Problem*
- *Concepts – Examples with Tiles*
- *Concepts – Examples without tiles*
- *Practice Questions*

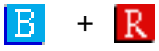
Additional Required Materials: Pencil Crayons (red and blue)

As you work through the computer exercises, make your notes in the **NOTES** section of this page.

When you reach the end of the section *Practice Questions* on the computer, move on to the **OFF COMPUTER EXERCISES** below**.**

NOTES:

Remember:

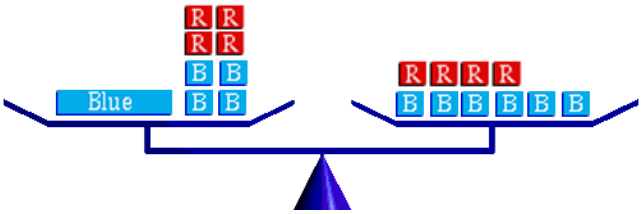
Tile	Represents
 Blue Tile	**1**
 Red Tile	**-1**
	**1-1 or 0**

Solve the following examples:

1. $x + 4 = 6$

$x = \underline{\mathbf{2}}$

Solution:
Place 4 red blocks on each side of the scale.
Since 1 + 1 = 0
∴ $x = 2$



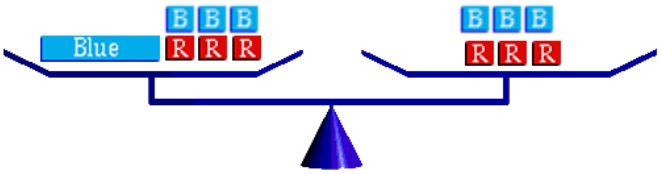
Draw the appropriate number of red tiles (-1) over the blue tiles (+1).

Remember to keep the balance balanced.

2. $b - 3 = -3$

$b = \underline{\mathbf{0}}$

Solution:
Add 3 blue blocks on each side of the scale.
Since 1 + 1 = 0
∴ $b = 0$



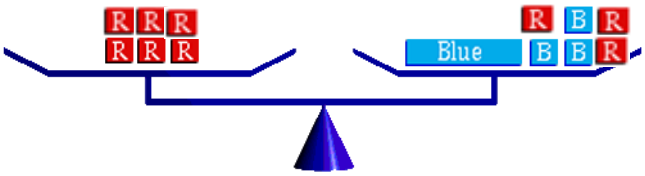
Draw the appropriate number of blue tiles (+1) over the red tiles (-1).

Remember to keep the balance balanced.

3. $-3 = m + 3$

$\underline{\mathbf{-6}} = m$

Solution:
Place 3 red blocks on each side of the scale.
Since 1 + 1 = 0
∴ $m = -6$

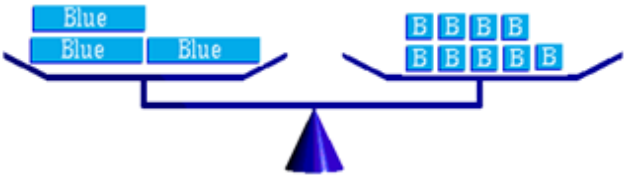


Draw the appropriate number of red tiles (-1) over the blue tiles (+1).

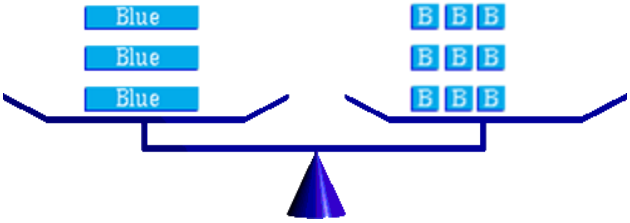
Remember to keep the balance balanced.

4. $3x = 9$

$x = 3$



In the diagram below, the blocks are arranged in three equal groups. Looking at one group, x = 3.

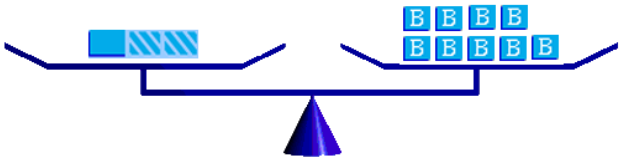


Isolate the x tile.
Rearrange each side into 3 equal groups

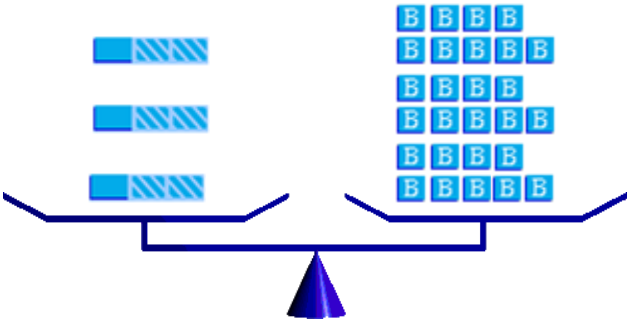
Remember to keep the balance balanced.

5. $\frac{1}{3}x = 9$

$x = 27$



In the diagram below, the blocks are tripled.
The left side is $\frac{1}{3}x + \frac{1}{3}x + \frac{1}{3}x = x$
The right side total is 27.



Isolate the x tile.
***Triple** the contents of each balance.*

Remember to keep the balance balanced.

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: **Check your answer in the original equation.**

Example:

Solve for x *(fill in the blanks)*

x + 6 = 7 **Step 1**

-6) **x + 6 - 6 = 7 - 6** **Step 2**

x = 1 **Step 3**

Checking

Left Side = x + 6 **Step 4**

= 1 + 6

= 7

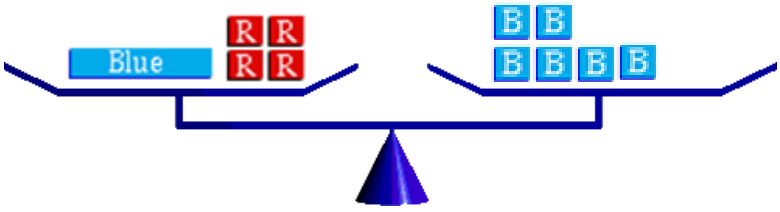
Right Side = 7

L.S. = R.S.
Therefore the solution x = 1 is correct

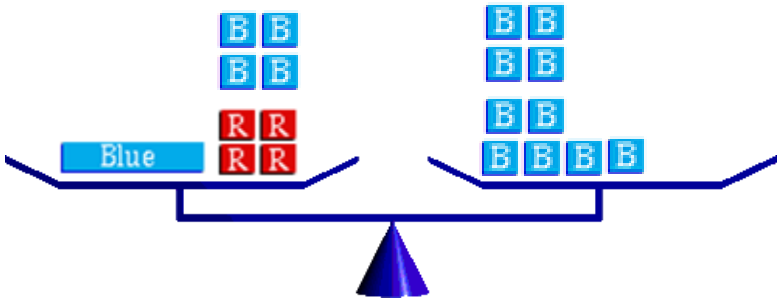
OFF COMPUTER EXERCISES

1. Given the equation $x - 4 = 6$.

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



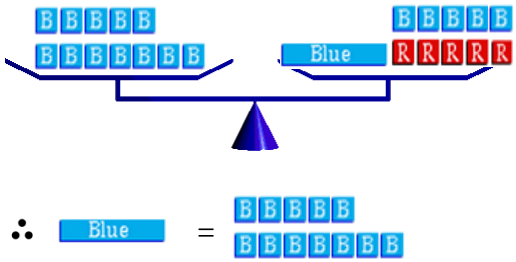
   (b) Isolate the x tile by manipulating the tiles. ***(Manipulate the tiles by adding an identical number of red or blue tile to each side)***



   (c) Write the resulting equation and simplify it.

$$\mathbf{x - 4 + 4 = 6 + 4}$$
$$\mathbf{x = 10}$$

2. Solve each equation $7 = x - 5$ in two ways.

With the Balance	Without the Balance
	**$7 = x - 5$** **+5) $5 + 7 = x - 5 + 5$** **$12 = x$** **Checking:** **L.S. = 7** **R.S. = $x - 5$** **$= (12) - 5$** **$= 7$** **Both sides simplify to the same number, the solution x = 12 is correct.**

(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.*

(a) $x - 5 = 7$

+5) $x - 5 + 5 = 7 + 5$

$x = 12$

Check:

L.S. $= x - 5$
$= 12 - 5$
$= 7$

R.S. $= 7$

L.S. = R.S , The solution is x = 12.

(b) $y + 3 = 8$

-3) $y + 3 - 3 = 8 - 3$

$y = 5$

Check:

L.S. $= y + 3$
$= 5 + 3$
$= 8$

R.S. $= 8$

L.S. = R.S, The solution is y = 5.

(c) $a + 7 = 3$

-7) $a + 7 - 7 = 3 - 7$

$a = -4$

Check:

L.S. $= a + 7$
$= -4 + 7$
$= 3$

R.S. $= 3$

L.S. = R.S, The solution is a = -4.

(d) $x + 6 = -4$

-6) $x + 6 - 6 = -4 - 6$

$x = -10$

Check:

L.S. $= x + 6$
$= -10 + 6$
$= -4$

R.S. $= -4$

L.S. = R.S , The solution is x = -10.

(e) $5y = -25$

÷5) $\frac{5y}{5} = \frac{-25}{5}$

$y = -5$

Check

L.S. = 5y **R.S. = -25**
= 5(-5)
= -25

L.S. = R.S , The solution is y = -5.

(f) $7b = 35$

÷7) $\frac{7b}{7} = \frac{35}{7}$

$b = 5$

Check

L.S. = 7b **R.S. = 35**
= 7(5)
= 35

L.S. = R.S , The solution is b = 5.

(g) $4n = -12$

÷4) $\frac{4n}{4} = \frac{-12}{4}$

$n = -3$

Check

L.S. = 4n **R.S. = -12**
= 4(-3)
= -12

L.S. = R.S, The solution is n = -3.

(h) $10x = 100$

÷10) $\frac{10x}{10} = \frac{100}{10}$

$x = 10$

Check

L.S. = 10x **R.S. = 100**
= 10(10)
= 100

L.S. = R.S, The solution is x = 10.

(i) $0.9x = 9$

÷0.9) $\frac{0.9x}{0.9} = \frac{9}{0.9}$

$x = \frac{90}{9}$

$x = 10$

Check

L.S. = 0.9x **R.S. = 9**
= 0.9(10)
= 9

L.S. = R.S, The solution is x = 10.

(j) $7p - 1 = 34$

+1) $7p - 1 + 1 = 34 + 1$

$7p = 35$

÷7) $\frac{7p}{7} = \frac{35}{7}$

$p = 5$

Check

L.S. = 7p - 1 **R.S. = 34**
= 7(5) - 1
= 35 – 1
= 34

L.S. = R.S, The solution is p = 5.