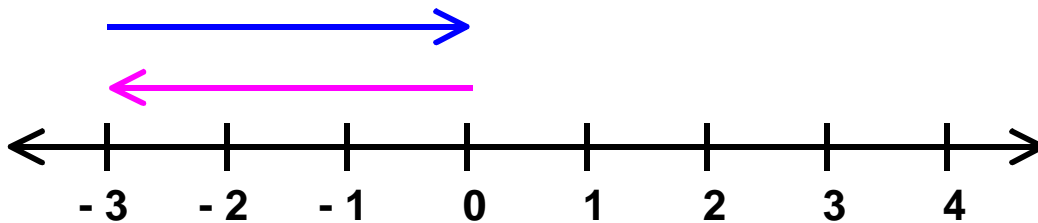


Subtracting Integers

Look at the number line below. What do you notice about -3 plus 3 ?



$-3 + 3$ brings us back to 0.

-3 and 3 are opposites of each other.

An integer and its opposite are called **additive inverses** of each other.

This leads us to another property.

Additive Inverse Property

The sum of an integer and its additive inverse is zero.

$$5 + (-5) = 0$$

$$x + (-x) = 0$$

To subtract an integer, add its additive inverse.

$$3 - 5 = 3 + (-5)$$

$$a - b = a + (-b)$$

Example 1: Solve each equation.

a. $m = 7 - 12$
 $m = 7 + (-12)$
 $m = -5$

To subtract
12. add -12.

b. $6 - (-11) = r$
 $6 + 11 = r$
 $17 = r$

To
subtract
-11,
add 11.

c. $y = -3 - (-9)$
 $y = -3 + 9$
 $y = 6$

To subtract
-9. add 9.

d. $-5 - 16 = x$
 $-5 + -16 = x$
 $-21 = x$

To
subtract
16, add
-16.

Try these 4 problems. Do them on paper and show your work. The answers are on the next page.

1. $m = -3 - 4$

2. $m = 3 - 4$

3. $m = -3 - (-4)$

4. $m = 3 - (-4)$

Answers.

$$1. \quad m = -3 - 4 \quad -7$$

$$2. \quad m = 3 - 4 \quad -1$$

$$3. \quad m = -3 - (-4) \quad 1$$

$$4. \quad m = 3 - (-4) \quad 7$$

If you did not get these answers and you still don't understand this, please let me know immediately.

Example 2:

Evaluate $b - (-5)$ if $b = -13$.

This is the same as in the first module.

$$\begin{aligned} b - (-5) &= -13 - (-5) && \text{Replace } b \text{ with } -13. \\ &= -13 + 5 && \text{Subtract } -5 \text{ by adding } 5. \\ &= -8 \end{aligned}$$

Try this practice problem. Do it on paper and show your work. The answer is on the next page.

Evaluate $d - (-12)$ if $d = -9$.

Answer.

$$d - (-12) = 3$$

Again, if you did not get this answer and you still don't understand this, please let me know immediately.

Example 3:

Simplify $5a - 14a$.

This is the same as with adding integers.

$$\begin{aligned} 5a - 14a &= 5a + (-14)a && \text{Add the additive inverse of } 14a. \\ &= [5 + (-14)]a && \text{Use the distributive property.} \\ &= -9a && \text{Add } 5 \text{ and } -14. \end{aligned}$$

If you can go directly from $5a - 14a$ to $-9a$, feel free to do so. Sometimes showing the distributive property can make it more confusing.

Here is one more practice problem. The answer is a few lines below.

Simplify $7b - 11b$.

Answer. **$-4b$**