

Multiplying Integers

You already know how to multiply 2 positive integers.

$$7 \times 3 = \underline{21} \text{ The product is POSITIVE.}$$

$$5 \times 100 = \underline{500} \text{ The product is POSITIVE.}$$

positive x positive = positive

What about if both integers are negative?

$$-7 \times -3 = 21$$

$$-5 \times -100 = 500$$

negative x negative = positive

This leads us to the following rule:

The product of two integers with the same sign is positive.

One of my former students (Nour Baz) remembers this in a special way:

The friend (positive) of my friend (positive) is my friend (positive).

$$+ * + = +$$

The enemy (negative) of my enemy (negative) is my friend (positive).

$$- * - = +$$

Think about that. Apply it to your own life. Does it hold true?

Following this logic, what would a negative (–) multiplied by a positive (+) yield?

The enemy (negative) of my friend (positive) would be my...enemy (negative).

$$- * + = -$$

Using the commutative property, you know that a positive times a negative will be negative.

To summarize multiplying integers:

positive x positive = positive
negative x negative = positive
negative x positive = negative
positive x negative = negative

Example 1:

Solve each equation.

a. $m = -5(18)$

The two factors have different signs. The product is **NEGATIVE**.

$$m = -5(18)$$
$$m = -90$$

b. $s = -8(-15)$

The two factors have the same signs. The product is **POSITIVE**.

$$s = -8(-15)$$
$$s = 120$$

c. $6(-12) = n$

The two factors have different signs. The product is **NEGATIVE**.

$$6(-12) = n$$
$$-72 = n$$

d. $-7(-5)(-4) = h$

$$[-7(-5)](-4) = h$$

$$35(-4) = h$$

$$-120 = h$$

Example 2:

Evaluate $2ab$ if $a = -3$ and $b = -2$.

$$\begin{aligned} 2ab &= 2(-3)(-2) && \text{Replace } a \text{ with } -3 \text{ and } b \text{ with } -2. \\ &= 2[(-3)(-2)] && \text{Associative property} \\ &= 2(6) && \text{The product of } -3 \text{ and } -2 \text{ is positive.} \\ &= 12 \end{aligned}$$

Example 3:

Find the product of -3 and $8m$.

$$\begin{aligned} -3(8m) &= (-3 * 8)m && \text{Associative property} \\ &= -24m \end{aligned}$$