Negative Numbers, Multiplication

Multiplication is fast adding of the same number. The problem (3) x (–2) is a way of writing (–2) counted three times, or (–2) + (–2) + (–2), or (–6). Think of it as borrowing $2 from someone for three days in a row. After three days, you will owe $6.

Example 1

   (–6)(+3) = (–18)

Example 2

   (+7)(–6) = (–42)

Once you understand multiplying a negative number by a positive number, consider what you would have if you were multiplying a negative number by a negative number. It will be the opposite of what you just learned, so you are back to being positive. There are only two options for a number: either it is negative, or it is positive.

Since you first learned about multiplication, you always multiplied positive numbers by positive numbers. The following examples will help you understand how to multiply a negative number times a negative number.

Example 3

   (+3)(+7) = (+21)

Example 4

   (–3)(+7) = (–21)

Example 5
$$(+3)(-7) = (-21)$$

The only option remaining is shown in Example 6.

Example 6
$$(-3)(-7) = (+21)$$

Think of negative anything as the opposite of what it was. When multiplying two negative numbers, the product is a positive number. Here are a several more ways of thinking of this.

In the English language, a double negative is a positive. I used to ask students if they were going to the local town fair. If they replied that they weren't not going. I would respond by saying that I would see them there. In response to their puzzled expressions I would explain that if they were "not, not going," then they were going.

Another way to think of it is using the idea of opposites as discussed in the previous lesson. Recall that $-(-21)$ is the same as $+21$. Using brackets for clarification, you can write $(-3)(-7)$ as $-[(3)(-7)]$ by moving the negative sign in front of the 3 outside of the brackets. After multiplying $(3)(-7)$, you have (-21) inside the brackets. Then, putting it all together, you have $-[-21]$, which is $(+21)$.

Example 7
$$(-12)(-5) = (+60)$$

Have you observed the pattern that, if you have two negative signs, you have a positive? The same holds for four negative signs. Whenever you have an even number of negative signs, the answer is positive, and an odd number of negative signs produces a negative number.

Figure 1
$$(-12) = (-12)$$
$$-(-12) = (+12)$$
$$-[-(-12)] = (-12)$$
$$-\{-[-(-12)]\} = (+12)$$