In the last sections, we practiced adding and subtracting integers. Now, we will practice multiplying and dividing them.

**Multiplication (Finding Products)**

Consider the products:

\[
\begin{align*}
3 \cdot 4 &= \\
2 \cdot 4 &= \\
1 \cdot 4 &= \\
0 \cdot 4 &= \\
-1 \cdot 4 &= \\
-2 \cdot 4 &= \\
-3 \cdot 4 &= \\
\end{align*}
\]

Now, consider the products:

\[
\begin{align*}
3 \cdot (-4) &= \\
2 \cdot (-4) &= \\
1 \cdot (-4) &= \\
0 \cdot (-4) &= \\
-1 \cdot (-4) &= \\
-2 \cdot (-4) &= \\
-3 \cdot (-4) &= \\
\end{align*}
\]

Notice that the product of 2 numbers…

- With the **same sign** is positive.
- With the **opposite sign** is negative.

**Example 1:** Multiply.

a) \(-4 \cdot 7\)

b) \(-5(-6)\)

c) \(4 \ast 11\)

d) \(-12(9)(0)\)

e) \(-2(3)(4)\)

f) \(4(-1)(-2)(5)\)

g) \(-2(4)(-2)(-3)\)

Notice that if there is an even number of negative numbers being multiplied, the product will be __________. If there is an odd number, the product will be ________________!
a) $4^2$

b) $(-4)^2$

c) $-4^2$

d) $(-2)^3$

e) $-2^3$

Commutative and Associative properties for multiplication are valid with integers the same as they are for whole numbers.

**Division (Finding Quotients)**

Recall that division is the reverse operation of multiplication, and multiplication can be used to check it. In other words, $\frac{12}{3} = 4$ because $4 \cdot 3 = 12$.

Due to the relationship with multiplication, the quotient of 2 numbers…

- With the **same sign** is positive.
- With the **opposite sign** is negative.

**Example 3:** Divide.

a) $80 \div 8$

b) $\frac{-72}{9}$

c) $\frac{-49}{-7}$

d) $\frac{0}{13}$

e) $\frac{6}{0}$
Example 4: Evaluate $\frac{x}{y}$ if $x = 56$ and $y = -8$.

Example 5: The number of farms in the U.S. dropped from 1,000,000 in 1998 to 600,000 in 2000. Find the average change in the number of farms from 1998 to 2000.

https://www.youtube.com/watch?v=rTMgdi0N7ug&list=PL9dj44OpeMZe_qNgDt_lqpnRjyGNkePq7&index=18

**Order of Operations**

Remember your order of operations: Grouping Symbols ~ Exponents ~ Mult/Div ~ Add/Subtract.

Also recall that when using exponents, the exponent ONLY applies to the base. For example, consider the following:

$2^3$

$(-3)^2$

$-3^2$

Finally, be careful when working with absolute value signs. For example, consider the below.

$-(-9) =$

$-|-9| =$

Example 6: Simplify the following.

a) $-2^4 \cdot 2$

b) $(-12) + 6 \div 3$

c) $| -4 + 2| \cdot 2^2$

d) $12 - 2(3 \cdot 2)$

e) $3(8 - 3) + (-4) - 10$

Example 7: Evaluate $-x^2$ if $x = -5$. 

3