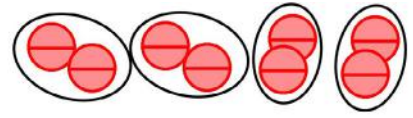


Dividing Integers

Divide a negative number by a positive

The image illustrates $(-8) \div 4$, or eight negatives divided into four groups. We can see the answer is -2 .



Any time a negative integer is divided by a positive integer, we can illustrate it as so many negative counters divided evenly into groups. The answer will be negative.

Divide a positive integer by a negative. For example, $24 \div (-8) = ?$

Remember, multiplication is the opposite operation to division. Let's write the answer to $24 \div (-8)$ as s . Then from that we can write a multiplication:

$$24 \div (-8) = s \Rightarrow (-8)s = 24$$

(You could use an empty line instead of s , if the variable s confuses you.)

The only number that fulfills the equation $(-8)s = 24$ is $s = -3$. Therefore, $24 \div (-8) = -3$.

Similarly, each time you divide a positive integer by a negative integer, the answer is negative.

Divide a negative integer by a negative. For example, $(-24) \div (-8) = ?$

Again, let's denote the answer to $-24 \div (-8)$ with y , and then write a multiplication sentence.

$$-24 \div (-8) = y \Rightarrow (-8)y = -24$$

The only number that fulfills the equation $(-8)y = -24$ is $y = 3$. Therefore, $-24 \div (-8) = 3$.

Similarly, each time you divide a negative integer by a negative integer, the answer is positive.

Summary. The symbols below show whether you get a positive or negative answer when you multiply or divide integers. Notice that the rules for multiplication and division are the same!

Multiplication

$$\oplus \cdot \oplus = \oplus$$

$$\ominus \cdot \oplus = \ominus$$

$$\oplus \cdot \ominus = \ominus$$

$$\ominus \cdot \ominus = \oplus$$

Examples

$$4 \cdot (-5) = -20$$

$$-4 \cdot 5 = -20$$

$$-4 \cdot (-5) = 20$$

$$4 \cdot 5 = 20$$

Division

$$\oplus \div \oplus = \oplus$$

$$\ominus \div \oplus = \ominus$$

$$\oplus \div \ominus = \ominus$$

$$\ominus \div \ominus = \oplus$$

Examples

$$20 \div (-5) = -4$$

$$-20 \div 5 = -4$$

$$-20 \div (-5) = 4$$

$$20 \div 5 = 4$$

Here is a shortcut for *multiplication* and *division* (NOT for addition or subtraction):

- If both numbers have the same sign (both are positive *or* negative), the answer is positive.
- If the numbers have different signs, the answer is negative.

1. Divide.

a. $-50 \div (-5) = \underline{\hspace{2cm}}$

$-12 \div 2 = \underline{\hspace{2cm}}$

b. $(-8) \div (-1) = \underline{\hspace{2cm}}$

$14 \div (-2) = \underline{\hspace{2cm}}$

c. $81 \div (-9) = \underline{\hspace{2cm}}$

$-100 \div (-10) = \underline{\hspace{2cm}}$