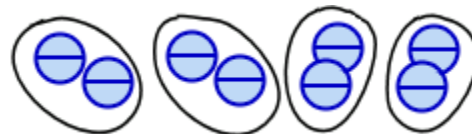


Dividing Integers

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 into groups. The answer will be negative.

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

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

Remember multiplication is the opposite operation of division. Let's write the answer of $24 \div (-8)$ as s . Then we write a multiplication equation using the division:

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

(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 mark the answer to $-24 \div (-8)$ with y , and then write a multiplication sentence.

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

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	Examples	Division	Examples
$\oplus \times \ominus = \ominus$	$4 \times (-5) = -20$	$\oplus \div \ominus = \ominus$	$20 \div (-5) = -4$
$\ominus \times \oplus = \ominus$	$-4 \times 5 = -20$	$\ominus \div \oplus = \ominus$	$-20 \div 5 = -4$
$\ominus \times \ominus = \oplus$	$-4 \times (-5) = 20$	$\ominus \div \ominus = \oplus$	$-20 \div (-5) = 4$
$\oplus \times \oplus = \oplus$	$4 \times 5 = 20$	$\oplus \div \oplus = \oplus$	$20 \div 5 = 4$

Here's a shortcut for multiplication and division (NOT addition or subtraction):

- If both numbers have the same sign (both are positive *or* negative), the answer is positive.
- Otherwise, 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. $81 \div (-9) = \underline{\hspace{2cm}}$ $-100 \div (-10) = \underline{\hspace{2cm}}$
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2. Multiply. Then write a division equation for each multiplication, using the same numbers.

a. $-5 \times (-5) = \underline{\hspace{2cm}}$ $\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$	b. $9 \times (-6) = \underline{\hspace{2cm}}$ $\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$	c. $-80 \times 8 = \underline{\hspace{2cm}}$ $\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
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3. Complete the patterns.

a.	b.	c.
$12 \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = -3$	$60 \div \underline{\hspace{2cm}} = 2$
$8 \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = -2$	$40 \div \underline{\hspace{2cm}} = 2$
$4 \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = -1$	$20 \div \underline{\hspace{2cm}} = 2$
$0 \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = 0$	$-20 \div \underline{\hspace{2cm}} = 2$
$(-4) \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = 1$	$-40 \div \underline{\hspace{2cm}} = 2$
$(-8) \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = 2$	$-60 \div \underline{\hspace{2cm}} = 2$
$(-12) \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = 3$	$-80 \div \underline{\hspace{2cm}} = 2$
$(-16) \div 4 = \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}} \div (-7) = 4$	$-100 \div \underline{\hspace{2cm}} = 2$

4. Here's a funny riddle. Solve the math problems to uncover the answer.

E $\underline{\hspace{2cm}} \div (-8) = 2$

N $-12 \times (-5) = \underline{\hspace{2cm}}$

E $(-144) \div 12 = \underline{\hspace{2cm}}$

E $3 \times (-12) = \underline{\hspace{2cm}}$

H $\underline{\hspace{2cm}} \div 12 = -5$

T $-4 \times (-9) = \underline{\hspace{2cm}}$

N $-15 \div \underline{\hspace{2cm}} = -5$

E $\underline{\hspace{2cm}} \times (-6) = 0$

V $-45 \div \underline{\hspace{2cm}} = 5$

G $-1 \times (-9) = \underline{\hspace{2cm}}$

I $-27 \div 9 = \underline{\hspace{2cm}}$

I $-7 \times \underline{\hspace{2cm}} = -84$

S $-48 \div 6 = \underline{\hspace{2cm}}$

N $3 \times \underline{\hspace{2cm}} = -24$

Why is six afraid of seven? Because....

-8 -12 -9 -36 60

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0 12 9 -60 36

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3 -3 -8 -16

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