



# The Four Operations with Negative Numbers

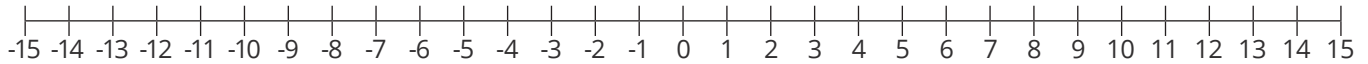
## Prior Knowledge:

Be able to perform the four operations with positive numbers.

A **negative** number is **less than** zero. A negative number is written with a minus sign in front.

The four operations are addition (+), subtraction (-), multiplication (×) and division (÷).

When adding and subtracting negative numbers, it may help to have a number line.



## Addition and Subtraction

### Example 1

Calculate  $-6 + 4$ .

Find the starting number. **-6**

Now, look at the sign immediately to the right of this number. This tells you whether to move right or left from your starting number; + tells you to go right, up the number line, and - tells you to move down, to the left.

In this question, you will move right (up the number line).

The second number tells you how many to move up or down, which, in this case will be 4.

$$-6 + 4 = -2$$

### Example 3

Calculate  $-6 - -9$ .

This question has two signs next to each other; when this happens, you can substitute the pair for a single function to simplify the calculation.

**++ or -- are replaced by +.**

**+ - or - + are replaced by -.**

So,  $-6 - -9$  becomes  $-6 + 9$ .

Following the same steps as before gives you an answer of **3**.

### Example 2

Calculate  $-3 - 5$ .

Find the starting number. **-3**.

Look at the sign immediately to the right of this number: -

This tells you to move down (left) along the number line.

5 tells you that this will be 5 places.

$$-3 - 5 = -8$$

### Example 4

Calculate  $-5 + -2$ .

**+ - or - + are replaced by -.**

$-5 + -2$  becomes  $-5 - 2$ .

$$-5 - 2 = -7$$



## Multiplication and Division

The methods for multiplying and dividing negative numbers are completely different from those for adding and subtracting.

Firstly, ignore any negative signs and complete the multiplication or division with positive numbers.

Once you have calculated the multiplication or division, now take note of the signs in the question.

If they are **both negative** or **both positive**, your answer will be **positive**.

If there is **one of each**, your answer will be **negative**.

### Example 1

Calculate  $-7 \times 3$ .

Complete the multiplication with positive numbers.  $7 \times 3 = 21$

Now, look at the signs. There is a **negative** sign with 7 and there doesn't appear to be anything with 3. (If there doesn't appear to be a sign with a number, the number is positive.)

We have one of each so the answer will be negative.

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

### Example 2

Calculate  $-45 \div -9$ .

Complete the division with positive numbers.  $45 \div 9 = 5$ .

Now, look at the signs. Both signs are **negative**, so the answer will be **positive**.

$$-45 \div -9 = 5$$



Your Turn

1. Calculate the following:

a.  $4 - 5$

\_\_\_\_\_

e.  $-4 + 3$

\_\_\_\_\_

i.  $-2 - -8$

\_\_\_\_\_

m.  $11 - 20$

\_\_\_\_\_

b.  $2 + -6$

\_\_\_\_\_

f.  $-7 + 11$

\_\_\_\_\_

j.  $10 - -9$

\_\_\_\_\_

n.  $43 - 56$

\_\_\_\_\_

c.  $10 - 12$

\_\_\_\_\_

g.  $-4 + -8$

\_\_\_\_\_

k.  $-2 - -16$

\_\_\_\_\_

o.  $-21 + -15$

\_\_\_\_\_

d.  $-10 + 2$

\_\_\_\_\_

h.  $-2 + -3$

\_\_\_\_\_

l.  $7 - -4$

\_\_\_\_\_

2. Calculate the following:

a.  $4 \times -2$

\_\_\_\_\_

f.  $-64 \div -4$

\_\_\_\_\_

k.  $-7 \times -13$

\_\_\_\_\_

p.  $(-12)^2$

\_\_\_\_\_

b.  $-11 \times 12$

\_\_\_\_\_

g.  $-9 \times -12$

\_\_\_\_\_

l.  $12 \div -0.5$

\_\_\_\_\_

q.  $(-8)^2$

\_\_\_\_\_

c.  $10 \times -8$

\_\_\_\_\_

h.  $24 \times -6$

\_\_\_\_\_

m.  $-1 \div -2$

\_\_\_\_\_

r.  $(-3)^3$

\_\_\_\_\_

d.  $-18 \div -3$

\_\_\_\_\_

i.  $-120 \div 4$

\_\_\_\_\_

n.  $-146 \times 6$

\_\_\_\_\_

e.  $-56 \div 7$

\_\_\_\_\_

j.  $685 \div -5$

\_\_\_\_\_

o.  $-254 \times -8$

\_\_\_\_\_



3. Complete the table.

+	-2	-1	2	5	10
-6				$-6 + 5 = -1$	
-10	$-10 + -2 = -12$				
2					
3			$3 + 2 = 5$		
-4					

4. Write down seven multiplications with an answer of -20.

\_\_\_\_\_

\_\_\_\_\_

### Challenge

Below are five cards, each with a number written on it.



a. Choose two suitable cards to make the calculation correct.

$$\square + \square = -1$$

b. Choose two cards that will give the smallest possible answer.

$$\square + \square = \underline{\hspace{2cm}}$$

c. Choose two cards that will give the greatest possible answer.

$$\square - \square = \underline{\hspace{2cm}}$$