

Negative Numbers: Quick Questions

Mini whiteboard questions, with solutions

Contents

- Ordering positive and negative integers
- Adding and subtracting with negative numbers
- Multiplying and dividing with negative numbers
- Repeated multiplication with negative numbers
- Arithmetic with negative decimals

Ordering positive and negative integers

True or false?

-8 is greater than -3

True or false?

-8 is greater than -3

False. -8 is further to the left on the number line, so -8 is less than -3 .

$$-8 < -3$$



True or false?

—1 is greater than —100

True or false?

−1 is greater than −100

True. −1 is to the right of −100 on the number line, and the numbers get larger as we move to the right.

$$-1 > -100$$

True or false?

0 is the smallest number

True or false?

0 is the smallest number

False. Every negative number is less than 0.

For example, $-1 < 0$.

True or false?

$$-6 < 2$$

True or false?

$$-6 < 2$$

True. Every negative number is less than every positive number.

True or false?

In order from smallest to largest:

$-2, -5, -9$

True or false?

In order from smallest to largest:

$-2, -5, -9$

False. The larger the number after the minus sign, the further the number is to the left of 0, so the smaller it is.

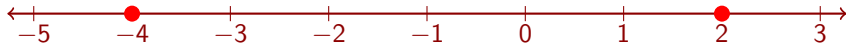
In order from smallest to largest: $-9, -5, -2$



Which is larger, -4 or 2 ?

Which is larger, -4 or 2 ?

2 is to the right of -4 on the number line, so 2 is larger.



Which is smaller, -7 or -2 ?

Which is smaller, -7 or -2 ?

-7 is to the left of -2 on the number line, so -7 is smaller.



Write $<$ or $>$ in the box

$$-6 \quad \square \quad -9$$

Write $<$ or $>$ in the box

$$-6 \quad \square \quad -9$$

-6 is to the right of -9 on the number line.

$$-6 > -9$$



Write these numbers in order,
smallest first

3, -1 , -5 , 0, 2

Write these numbers in order,
smallest first

3, -1, -5, 0, 2

-5, -1, 0, 2, 3



Write these numbers in order,
smallest first

-12 , 8 , -3 , -20 , 5

Write these numbers in order,
smallest first

-12 , 8 , -3 , -20 , 5

-20 , -12 , -3 , 5 , 8



Write these numbers in order,
largest first

$-14,$ $-41,$ $-4,$ $-11,$ -1

Write these numbers in order,
largest first

-14 , -41 , -4 , -11 , -1

-1 , -4 , -11 , -14 , -41

-41 is the furthest to the left of 0, so it is the smallest.



The temperatures in four cities at midnight

Oslo	London	Warsaw	Berlin
-8°C	5°C	-3°C	-1°C

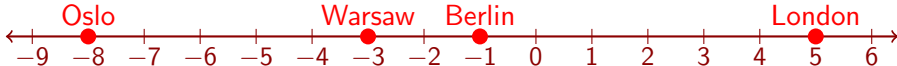
Write the cities in order, coldest first.

The temperatures in four cities at midnight

Oslo	London	Warsaw	Berlin
-8°C	5°C	-3°C	-1°C

Write the cities in order, coldest first.

Oslo, Warsaw, Berlin, London



List the integers that are
greater than -4 and less than 1

List the integers that are
greater than -4 and less than 1

$-3, -2, -1, 0$

-4 and 1 are not included, and 0 is an integer.



n is an integer and $-5 < n \leq -2$

List the possible values of n

n is an integer and $-5 < n \leq -2$

List the possible values of n

$n = -4, -3$ or -2

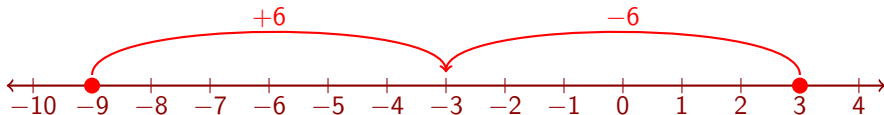
n must be greater than -5 , so -5 is not included. n can be equal to -2 , so -2 is included.



Which number is halfway
between -9 and 3 ?

Which number is halfway between -9 and 3 ?

From -9 to 3 is 12 steps, and half of 12 is 6.
 $-9 + 6 = -3$ and $3 - 6 = -3$, so -3 is halfway.



Adding and subtracting with negative numbers

True or false?

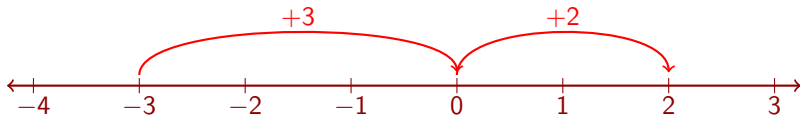
$$-3 + 5 = -8$$

True or false?

$$-3 + 5 = -8$$

False. Start at -3 and move 5 to the right.

$$-3 + 5 = 2$$



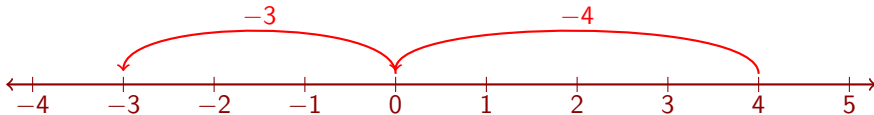
True or false?

$$4 - 7 = -3$$

True or false?

$$4 - 7 = -3$$

True. Start at 4 and move 7 to the left. The first 4 steps take us to 0, and the other 3 take us to -3 .



True or false?

$$6 - (-2) = 4$$

True or false?

$$6 - (-2) = 4$$

False. In the pattern, each answer is 1 more than the one above.

$$6 - 2 = 4$$

$$6 - 1 = 5$$

$$6 - 0 = 6$$

$$6 - (-1) = 7$$

$$6 - (-2) = 8$$

Subtracting -2 is the same as adding 2.

$$6 - (-2) = 6 + 2 = 8$$

True or false?

$5 + (-3)$ is the same as $5 - 3$

True or false?

$5 + (-3)$ is the same as $5 - 3$

True. Adding -3 is the same as subtracting 3.

Both are equal to 2.

True or false?

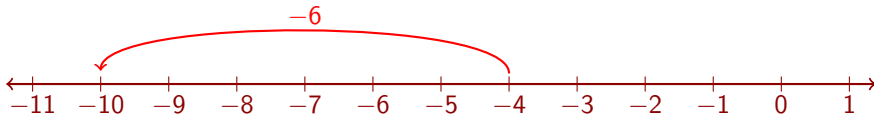
Two negatives make a positive,
so $-4 - 6 = 10$

True or false?

Two negatives make a positive,
so $-4 - 6 = 10$

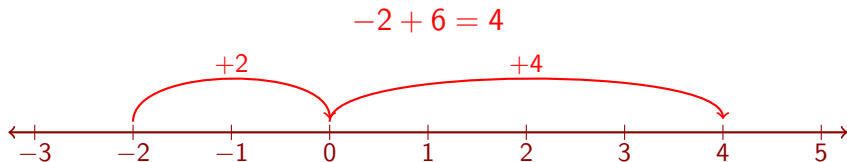
False. That rule is for multiplying and dividing, not for adding and subtracting.

Start at -4 and move 6 to the left: $-4 - 6 = -10$



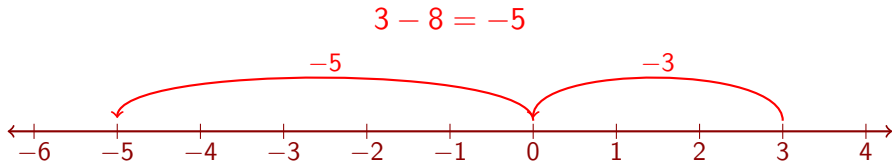
Work out $-2 + 6$

Work out $-2 + 6$



Work out $3 - 8$

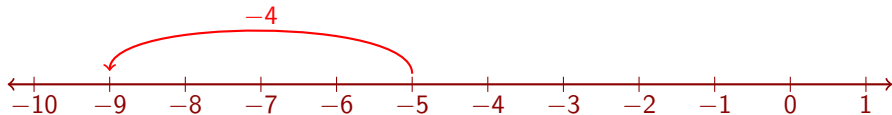
Work out $3 - 8$



Work out $-5 - 4$

Work out $-5 - 4$

$$-5 - 4 = -9$$



Work out $7 + (-3)$

Work out $7 + (-3)$

Adding -3 is the same as subtracting 3.

$$7 + (-3) = 7 - 3 = 4$$

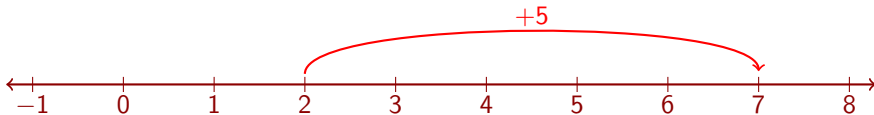


Work out $2 - (-5)$

Work out $2 - (-5)$

Subtracting -5 is the same as adding 5.

$$2 - (-5) = 2 + 5 = 7$$

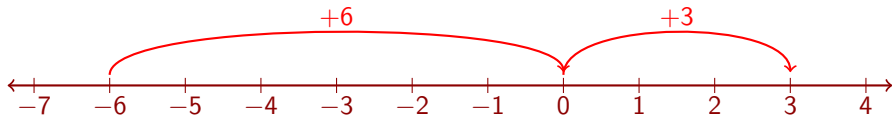


Work out $-6 - (-9)$

Work out $-6 - (-9)$

Subtracting -9 is the same as adding 9.

$$-6 - (-9) = -6 + 9 = 3$$

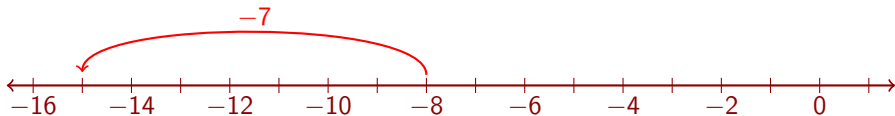


Work out $-8 + (-7)$

Work out $-8 + (-7)$

Adding -7 is the same as subtracting 7.

$$-8 + (-7) = -8 - 7 = -15$$



A bank account has a balance of $-\pounds 35$.
 $\pounds 50$ is paid in, then $\pounds 28$ is spent.
What is the balance now?

A bank account has a balance of $-\pounds 35$.

$\pounds 50$ is paid in, then $\pounds 28$ is spent.

What is the balance now?

$$-35 + 50 = 15$$

$$15 - 28 = -13$$

The balance is $-\pounds 13$.

At midnight the temperature is -4°C .

By noon it is 9°C .

By how many degrees has the temperature risen?

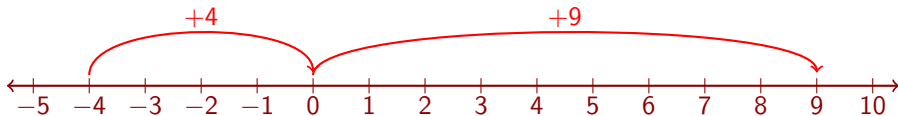
At midnight the temperature is -4°C .

By noon it is 9°C .

By how many degrees has the temperature risen?

$$9 - (-4) = 9 + 4 = 13$$

The temperature has risen by 13 degrees.



Find the missing number

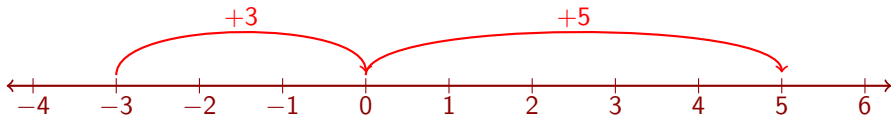
$$-3 - \square = 5$$

Find the missing number

$$-3 - \square = 5$$

5 is larger than -3 , so the number being subtracted must be negative.

$-3 - (-8) = -3 + 8 = 5$, so the missing number is -8 .



Multiplying and dividing with negative numbers

True or false?

$$(-3) \times (-2) = -6$$

True or false?

$$(-3) \times (-2) = -6$$

False. In the pattern, each answer is 3 more than the one above.

$$(-3) \times 2 = -6$$

$$(-3) \times 1 = -3$$

$$(-3) \times 0 = 0$$

$$(-3) \times (-1) = 3$$

$$(-3) \times (-2) = 6$$

A negative number multiplied by a negative number is positive.

$$(-3) \times (-2) = 6$$

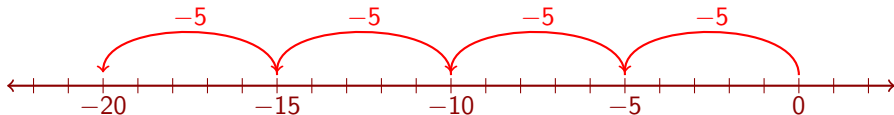
True or false?

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

True or false?

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

True. $4 \times (-5)$ is four lots of -5 .



True or false?

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

True or false?

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

False. $(-4) \times 5 = -20$, so $-20 \div (-4) = 5$.

The signs are the same, so the answer is positive.

True or false?

$$-18 \div 3 = -6$$

True or false?

$$-18 \div 3 = -6$$

True. $3 \times (-6) = -18$, so $-18 \div 3 = -6$.

The signs are different, so the answer is negative.

True or false?

$$(-7) \times 3 \text{ and } 7 \times (-3)$$

give the same answer

True or false?

$$(-7) \times 3 \text{ and } 7 \times (-3)$$

give the same answer

True. Each has one negative number, so each answer is negative.

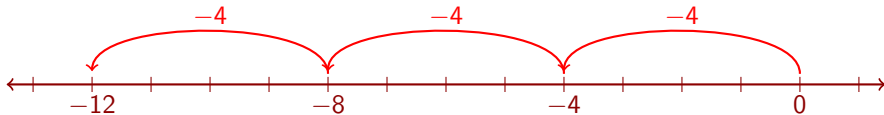
$$(-7) \times 3 = -21 \text{ and } 7 \times (-3) = -21$$

Work out $3 \times (-4)$

Work out $3 \times (-4)$

$3 \times (-4)$ is three lots of -4 .

$$3 \times (-4) = -12$$



Work out $(-6) \times (-3)$

Work out $(-6) \times (-3)$

The signs are the same, so the answer is positive.

$$(-6) \times (-3) = 18$$

Work out $-15 \div 5$

Work out $-15 \div 5$

The signs are different, so the answer is negative.

$$-15 \div 5 = -3, \text{ because } 5 \times (-3) = -15.$$

Work out $24 \div (-6)$

Work out $24 \div (-6)$

The signs are different, so the answer is negative.

$$24 \div (-6) = -4, \text{ because } (-6) \times (-4) = 24.$$

Work out $-35 \div (-7)$

Work out $-35 \div (-7)$

The signs are the same, so the answer is positive.

$$-35 \div (-7) = 5, \text{ because } (-7) \times 5 = -35.$$

Work out $(-9) \times (-8)$

Work out $(-9) \times (-8)$

The signs are the same, so the answer is positive.

$$(-9) \times (-8) = 72$$

Work out $\frac{-56}{8}$

Work out $\frac{-56}{8}$

The fraction bar means divide: $-56 \div 8$.

The signs are different, so the answer is negative.

$$\frac{-56}{8} = -7$$

Find the missing number

$$(-4) \times \square = 28$$

Find the missing number

$$(-4) \times \square = 28$$

28 is positive, so the missing number has the same sign as -4 .

$28 \div (-4) = -7$, so the missing number is -7 .

Over 6 hours the temperature changes by -18°C .

It changes by the same amount each hour.

What is the change each hour?

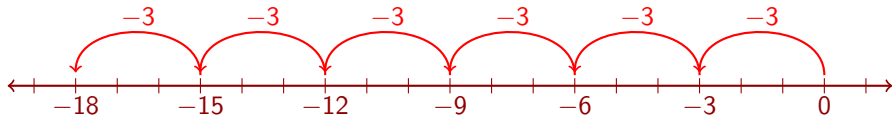
Over 6 hours the temperature changes by -18°C .

It changes by the same amount each hour.

What is the change each hour?

$$-18 \div 6 = -3$$

The temperature changes by -3°C each hour, which is a fall of 3 degrees.



Find two integers whose
product is -12 and whose sum is 1

Find two integers whose
product is -12 and whose sum is 1

The product is negative, so one integer is negative
and the other is positive.

$$4 \times (-3) = -12 \text{ and } 4 + (-3) = 1$$

The integers are 4 and -3 .

Repeated multiplication with negative numbers

True or false?

$(-2) \times (-3) \times (-1)$ is positive

True or false?

$(-2) \times (-3) \times (-1)$ is positive

False. Each negative number changes the sign of the product. There are three negative numbers, and three is odd, so the product is negative.



True or false?

$$(-3)^2 = -9$$

True or false?

$$(-3)^2 = -9$$

False. $(-3)^2$ means $(-3) \times (-3)$.

The signs are the same, so $(-3)^2 = 9$.

True or false?

$$(-1)^{100} = 1$$

True or false?

$$(-1)^{100} = 1$$

True. There are 100 negative numbers multiplied together, and 100 is even, so the product is positive.

$(-1) \times (-1) = 1$, and each pair of (-1) s gives 1.

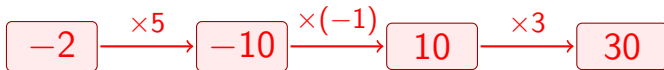
True or false?

$(-2) \times 5 \times (-1) \times 3$ is negative,
because it has negative numbers in it

True or false?

$(-2) \times 5 \times (-1) \times 3$ is negative,
because it has negative numbers in it

False. There are two negative numbers, and two is even, so the product is positive.



True or false?

$$(-2)^3 = -8$$

True or false?

$$(-2)^3 = -8$$

True. $(-2)^3$ means $(-2) \times (-2) \times (-2)$. There are three negative numbers, and three is odd, so the product is negative.



Work out $(-2) \times (-3) \times 4$

Work out $(-2) \times (-3) \times 4$

Two negative numbers: two is even, so the product is positive.



Work out $(-1) \times (-5) \times (-2)$

Work out $(-1) \times (-5) \times (-2)$

Three negative numbers: three is odd, so the product is negative.



Work out $(-4)^2$

Work out $(-4)^2$

$$(-4)^2 = (-4) \times (-4) = 16$$

Work out $(-2)^3$

Work out $(-2)^3$

$$(-2)^3 = (-2) \times (-2) \times (-2)$$

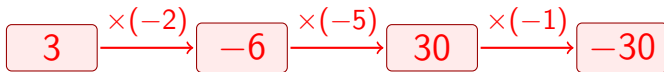
Three negative numbers: three is odd, so the product is negative.



Work out $3 \times (-2) \times (-5) \times (-1)$

Work out $3 \times (-2) \times (-5) \times (-1)$

Three negative numbers: three is odd, so the product is negative.



Work out $(-1)^7$

Work out $(-1)^7$

Seven negative numbers are multiplied together.

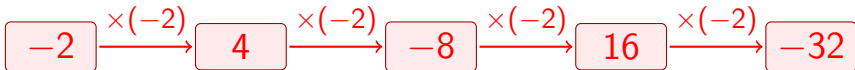
Seven is odd, so the product is negative.

$$(-1)^7 = -1$$

Work out $(-2)^5$

Work out $(-2)^5$

Five negative numbers: five is odd, so the product is negative.



Is this product positive or negative?

$$(-3) \times (-7) \times (-11) \times (-13) \times (-2)$$

Is this product positive or negative?

$$(-3) \times (-7) \times (-11) \times (-13) \times (-2)$$

There are five negative numbers.

Five is odd, so the product is negative.

There is no need to work out the product.

Work out $\frac{(-6) \times (-4)}{-3}$

Work out $\frac{(-6) \times (-4)}{-3}$

$$(-6) \times (-4) = 24$$

$$24 \div (-3) = -8$$

Four integers multiply to give -24 .

Write down one possible set
of four integers.

Four integers multiply to give -24 .

Write down one possible set
of four integers.

An odd number of the integers must be negative.

For example, $(-1) \times 2 \times 3 \times 4 = -24$

or $(-1) \times (-2) \times (-3) \times 4 = -24$

Arithmetic with negative decimals

True or false?

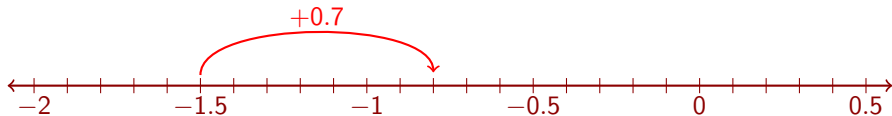
$$-1.5 + 0.7 = -2.2$$

True or false?

$$-1.5 + 0.7 = -2.2$$

False. Adding 0.7 moves 0.7 to the right, towards 0.

$$-1.5 + 0.7 = -0.8$$



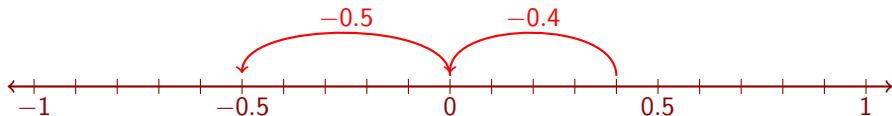
True or false?

$$0.4 - 0.9 = -0.5$$

True or false?

$$0.4 - 0.9 = -0.5$$

True. The first 0.4 takes us to 0, and the other 0.5 takes us to -0.5 .



True or false?

$$(-0.2) \times (-0.3) = 0.6$$

True or false?

$$(-0.2) \times (-0.3) = 0.6$$

False. The sign is right, but the size is not.

$0.2 \times 10 = 2$ and $0.3 \times 10 = 3$, and $2 \times 3 = 6$.

We multiplied by 10 twice, so we divide by 100.

$$(-0.2) \times (-0.3) = 0.06$$

True or false?

$$-2.4 \div 0.6 = -4$$

True or false?

$$-2.4 \div 0.6 = -4$$

True. We multiply the numerator and the denominator by 10.

$$\begin{aligned} -2.4 \div 0.6 &= \frac{-2.4}{0.6} \\ &= \frac{-24}{6} \\ &= -4 \end{aligned}$$

True or false?

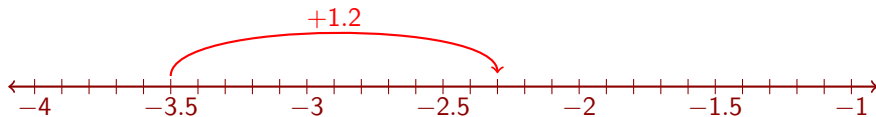
$$-3.5 - (-1.2) = -4.7$$

True or false?

$$-3.5 - (-1.2) = -4.7$$

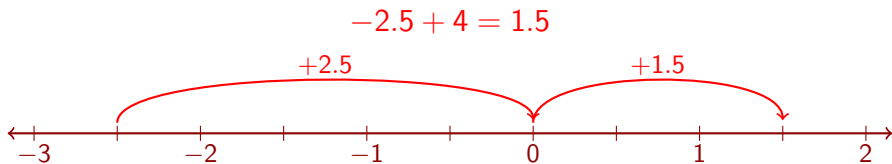
False. Subtracting -1.2 is the same as adding 1.2 .

$$-3.5 - (-1.2) = -3.5 + 1.2 = -2.3$$



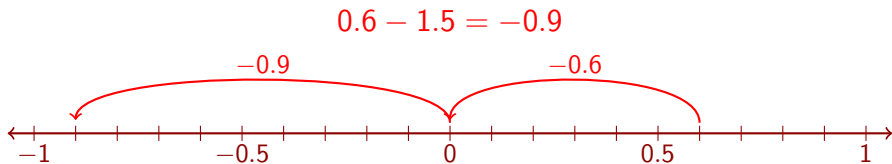
Work out $-2.5 + 4$

Work out $-2.5 + 4$



Work out $0.6 - 1.5$

Work out $0.6 - 1.5$

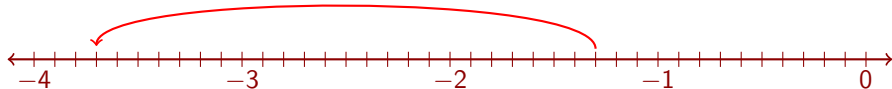


Work out $-1.3 - 2.4$

Work out $-1.3 - 2.4$

$$-1.3 - 2.4 = -3.7$$

-2.4



Work out $3.2 - (-1.7)$

Work out $3.2 - (-1.7)$

Subtracting -1.7 is the same as adding 1.7 .

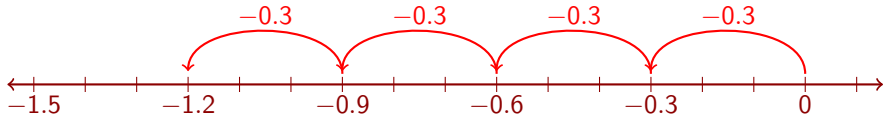
$$3.2 - (-1.7) = 3.2 + 1.7 = 4.9$$

Work out $(-0.3) \times 4$

Work out $(-0.3) \times 4$

$(-0.3) \times 4$ is four lots of -0.3 .

$$(-0.3) \times 4 = -1.2$$



Work out $(-0.6) \times (-0.7)$

Work out $(-0.6) \times (-0.7)$

The signs are the same, so the answer is positive.

$0.6 \times 10 = 6$ and $0.7 \times 10 = 7$, and $6 \times 7 = 42$.

We multiplied by 10 twice, so we divide by 100.

$$(-0.6) \times (-0.7) = 0.42$$

Work out $-3.6 \div 0.4$

Work out $-3.6 \div 0.4$

We multiply the numerator and the denominator by 10.

$$\begin{aligned} -3.6 \div 0.4 &= \frac{-3.6}{0.4} \\ &= \frac{-36}{4} \\ &= -9 \end{aligned}$$

Work out $-1.2 \div (-0.03)$

Work out $-1.2 \div (-0.03)$

We multiply the numerator and the denominator by 100.

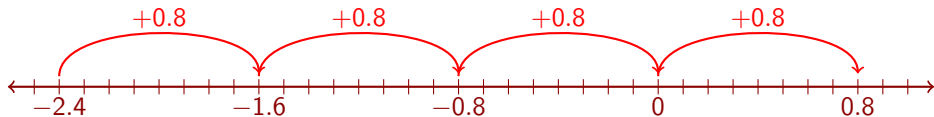
$$\begin{aligned} -1.2 \div (-0.03) &= \frac{-1.2}{-0.03} \\ &= \frac{-120}{-3} \\ &= 40 \end{aligned}$$

At 6 am the temperature is -2.4°C .
It rises by 0.8°C every hour for 4 hours.
What is the temperature at 10 am?

At 6 am the temperature is -2.4°C .
It rises by 0.8°C every hour for 4 hours.
What is the temperature at 10 am?

$$4 \times 0.8 = 3.2, \text{ and } -2.4 + 3.2 = 0.8$$

The temperature at 10 am is 0.8°C .



The temperatures on three nights were

-1.2°C , 0.5°C and -2.3°C

Work out the mean temperature.

The temperatures on three nights were

-1.2°C , 0.5°C and -2.3°C

Work out the mean temperature.

$$-1.2 + 0.5 + (-2.3) = -3$$

$$-3 \div 3 = -1$$

The mean temperature is -1°C .