

Multiplication and Division



Lesson 3

Factors



Fill in the missing blanks.

$$\square \times 6 = 36$$

$$5 \times \square = 45$$

$$56 \text{ divided by } 7 = \square$$

Fill in the missing blanks.

$$\boxed{6} \times 6 = 36$$

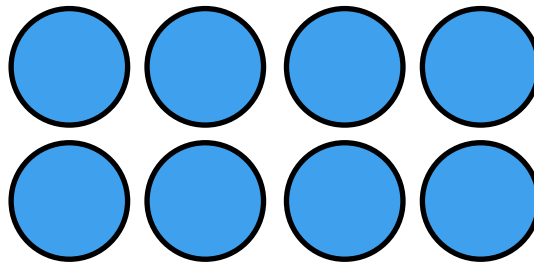
$$5 \times \boxed{9} = 45$$

$$56 \text{ divided by } 7 = \boxed{8}$$

What is a factor?

Let's explore this using arrays.
I want to find the factors for 8, so I'm going to use 8 counters.

I can lay them out this way:



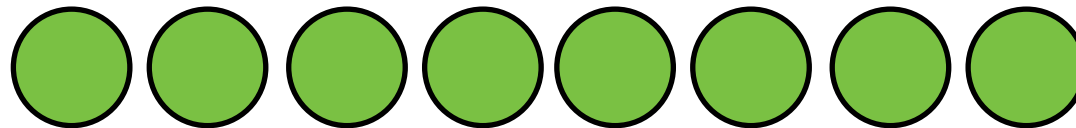
I can see that I have 2 rows of 4 or 4 columns of 2.

$$2 \times 4 \text{ or } 4 \times 2$$

What is a factor?

Let's explore this using arrays.
I want to find the factors for 8, so I'm going to use 8 counters.

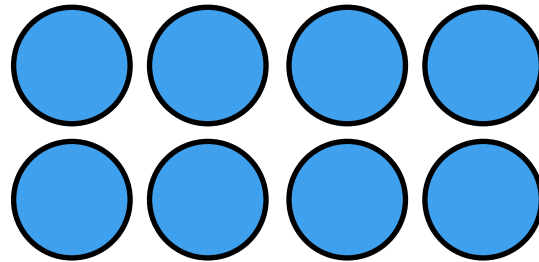
I can lay them out this way:



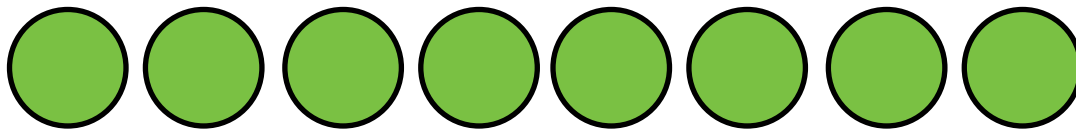
I can see that I have 1 rows of 8 or 8 columns of 1.

$$1 \times 8 \text{ or } 8 \times 1$$

What is a factor?



2×4 or 4×2



1×8 or 8×1

This shows me the **pairs of numbers** we can multiply to make 8.

This also shows the numbers 8 can be **divided by**.

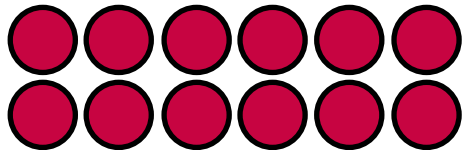
These are called **factors**. So the **factors of 8** are **1, 2, 4** and **8**.

What is a factor?

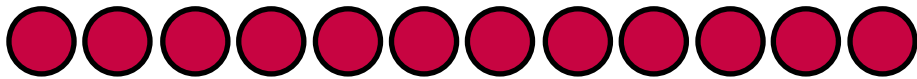
Factors are numbers that are **multiplied together** to produce a given number.

They are also numbers that a given number can be **divided by**.

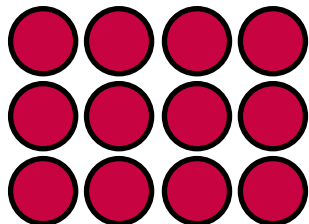
What number do these arrays represent? What are its factors?



2×6



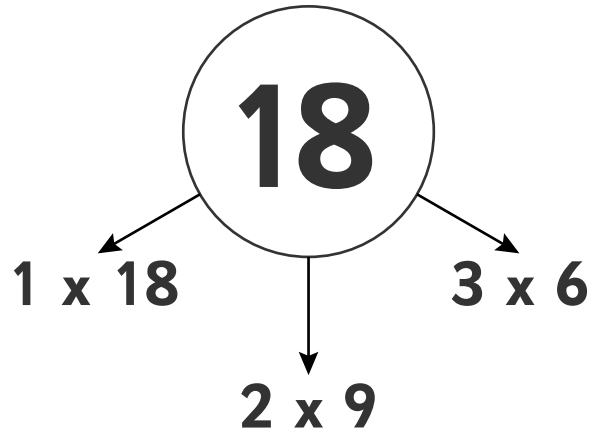
1×12



3×4

are factors of 12

We can also represent **factors** using a **factor diagram**



We can see that the factors are still in **pairs**.
This makes it easier for us to make sure we haven't missed any.

Complete these **factor diagrams**.

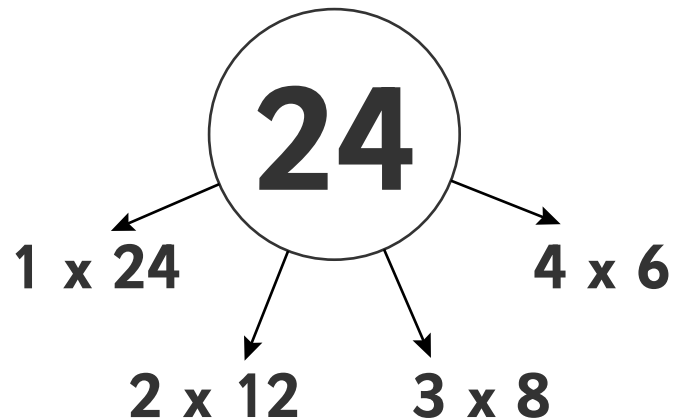
24

15

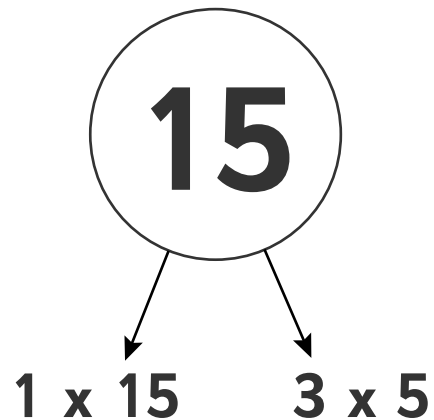
60

TOP TIP: Start at 1 and work through the times-tables to check you have found them all.
REMEMBER: find factors in pairs.

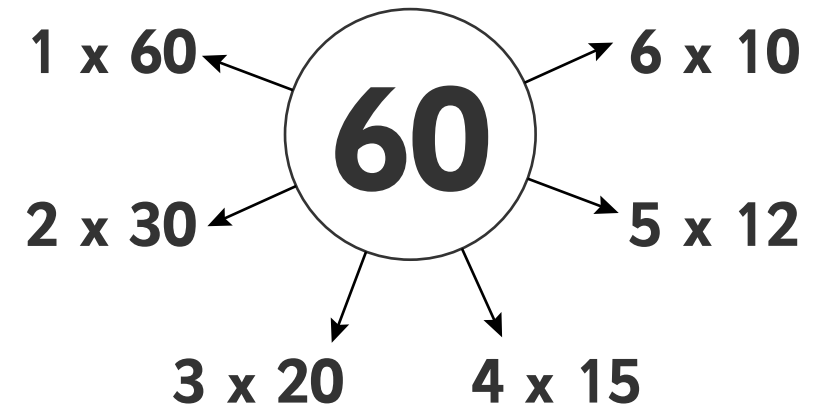
Complete these **factor diagrams**.



Factors of 24:

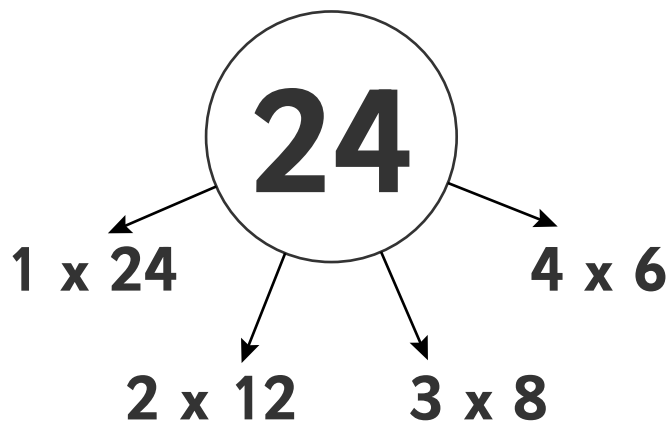


Factors of 15:



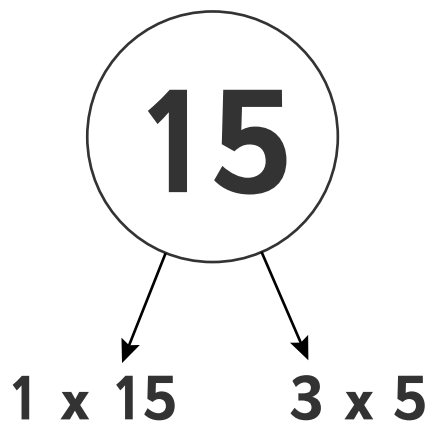
Factors of 60:

Complete these **factor diagrams**.



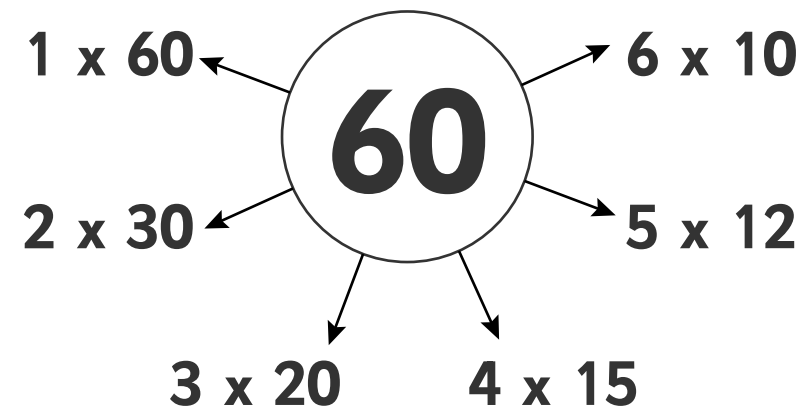
Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24



Factors of 15:

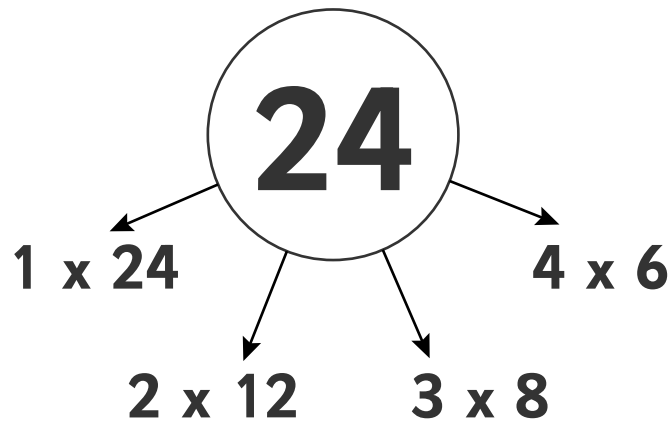
1, 3, 5 and 15



Factors of 60:

1, 2, 3, 4, 5, 6, 10, 12,
15, 20, 30 and 60

Let's look at the factors of 24.



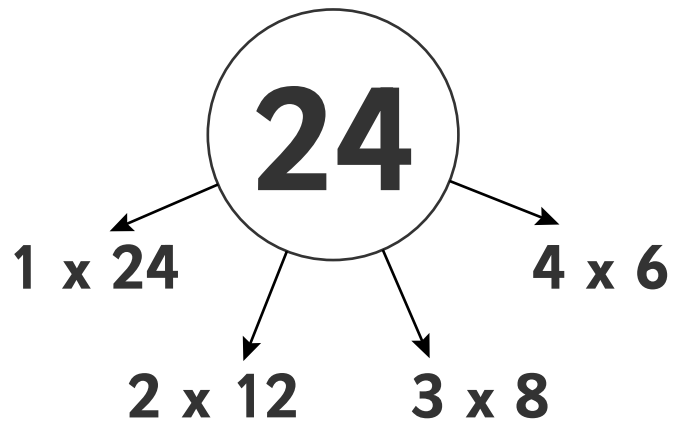
Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

The factors of 24 are the numbers that multiply to make 24.

They are also the numbers 24 can be divided by.

Let's look at the factors of 24.



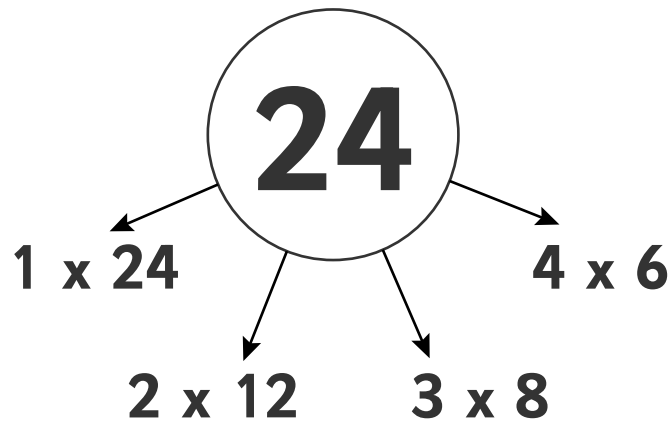
Let's express this in multiplication sentences:

___ is a factor of **24** because ___ x ___ = **24**

Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

Let's look at the factors of 24.



Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

Let's express this in multiplication sentences:

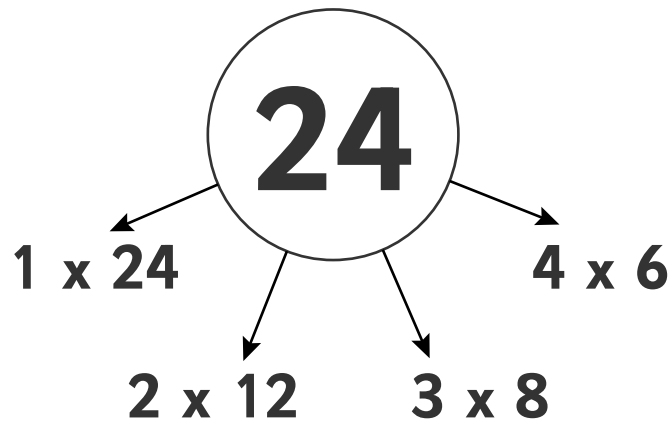
1 is a factor of **24** because 1 x 24 = **24**

24 is a factor of **24** because 24 x 1 = **24**

2 is a factor of **24** because 2 x 12 = **24**

12 is a factor of **24** because 12 x 2 = **24**

Let's look at the factors of 24.



Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

Let's express this in multiplication sentences:

3 is a factor of **24** because 3 x 8 = **24**

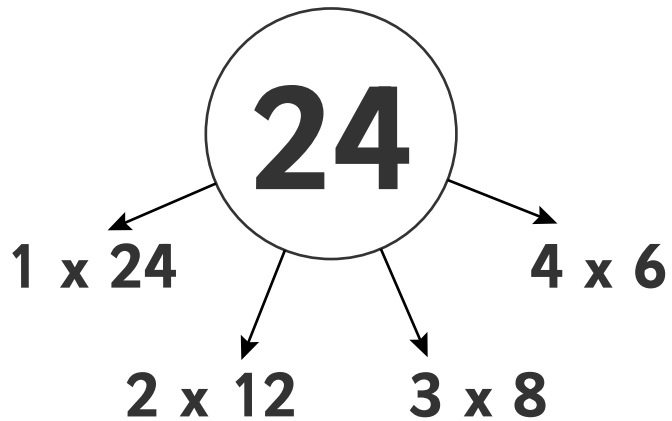
8 is a factor of **24** because 8 x 3 = **24**

4 is a factor of **24** because 4 x 6 = **24**

6 is a factor of **24** because 6 x 4 = **24**

Factors

Let's look at the factors of 24.



Let's express this in division sentences:

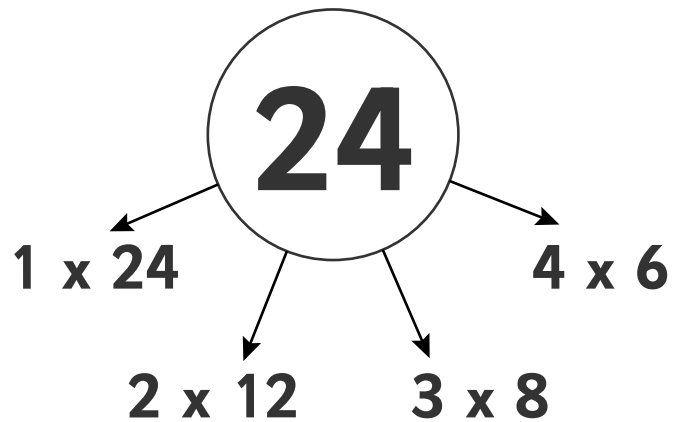
___ is a factor of **24** because **24** \div ___ = ___

Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24



Let's look at the factors of 24.



Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

Let's express this in division sentences:

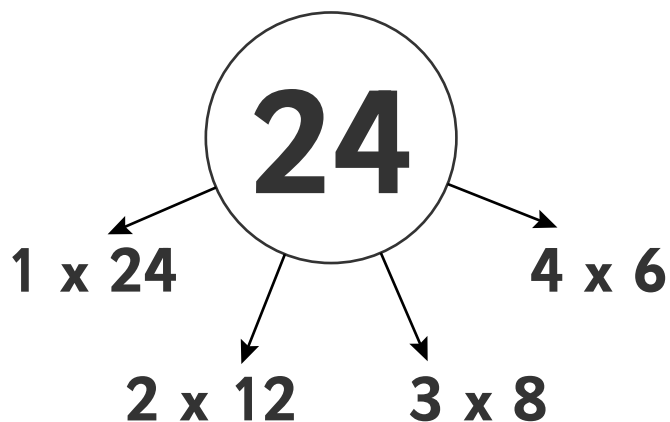
24 is a factor of **24** because $24 \div \underline{24} = \underline{1}$

1 is a factor of **24** because $24 \div \underline{1} = \underline{24}$

2 is a factor of **24** because $24 \div \underline{2} = \underline{12}$

12 is a factor of **24** because $24 \div \underline{12} = \underline{2}$

Let's look at the factors of 24.



Factors of 24:

1, 2, 3, 4, 6, 8, 12 and 24

Let's express this in division sentences:

3 is a factor of **24** because $24 \div \underline{3} = \underline{8}$

8 is a factor of **24** because $24 \div \underline{8} = \underline{3}$

4 is a factor of **24** because $24 \div \underline{4} = \underline{6}$

6 is a factor of **24** because $24 \div \underline{6} = \underline{4}$

Look at the sets of factors below. What do you notice?

Factors of 6: **1, 2, 3, 6**

Factors of 8: **1, 2, 4, 8**

Factors of 12: **1, 2, 3, 4, 6, 12**

Look at the sets of factors below. What do you notice?

Factors of 6: **1, 2, 3, 6**

Factors of 8: **1, 2, 4, 8**

Factors of 12: **1, 2, 3, 4, 6, 12**

All numbers have 1 and the number itself as factors.

Problem solving

Are these statements always, sometimes or never true?






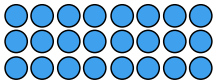





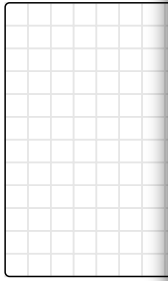

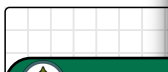

Statement	Always, sometimes, never
The target number can be divided by its factors	
Numbers have an even number of factors	
Any given number has 1 as a factor	



Are these statements always, sometimes or never true?

Statement	Always, sometimes, never
The target number can be divided by its factors	Always
Numbers have an even number of factors	Sometimes
Any given number has 1 as a factor	Always

Your turn! Try the worksheet.

<p>Factors</p>  <p>Pictorial</p>  <p>grammarsaurus.co.uk</p>	<p>1) Draw or make three</p>	<p>Factors</p> <p>$2+2=4$</p> <p>Fluency</p>  <p>grammarsaurus.co.uk</p>	<p>1) Find the all the factors for</p> <p>1. 36</p> <p>2. 27</p> <p>3. 60</p>	<p>Factors</p>  <p>Pictorial</p>  <p>grammarsaurus.co.uk</p>	<p>1) If you had 24 counters, what different ways could you arrange them in an array? One has been done for you.</p> <p style="text-align: center;">8</p> <p>3 </p>
<p>Factors</p>  <p>Multiple choice</p>  <p>grammarsaurus.co.uk</p>	<p>2) Circle all of the factors</p> <p>1 2</p>	<p>Factors</p> <p>True </p> <p>OR</p> <p>False </p>  <p>grammarsaurus.co.uk</p>	<p>2) 56 has more factors than 2</p> <p>True or false? Prove it!</p> 	<p>Factors</p> <p>$2+2=4$</p> <p>Fluency</p>  <p>grammarsaurus.co.uk</p>	<p>2) Write down all the factors for each of these numbers. How can you be sure you have found them all?</p> <p>a) 15</p> <p>b) 32</p> <p>c) 18</p> <p>_____</p> <p>_____</p>
<p>Factors</p> <p>$2+2=4$</p>	<p>3) Complete the factors</p>	<p>Factors</p> <p>$2+2=4$</p>	<p>3) The number 25 has 4 factors</p> 	<p>Factors</p> 	<p>3) Circle the odd one out in each set of numbers. Explain why it is the odd one out.</p> <p>1, 12, 2, 6, 8, 3, 4</p>