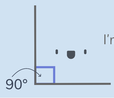
Angles

What do you need to know?

An **angle** is the space formed when two straight lines meet at a point. Angles are the **measurement of a turn**. They have different names depending on the size of the turn and we measure them in degrees. The symbol for degrees is a small circle °.

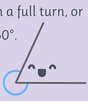
A **right angle** is a quarter turn, or 90°.



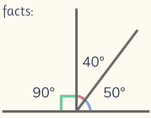
An **acute angle** is smaller than a quarter turn, or between 0° and 90°.

An **obtuse angle** is bigger than a right angle. It is between a quarter turn and a half turn, or between 90° and 180°.

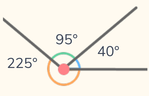
A **reflex angle** is bigger than a half turn but smaller than a full turn, or between 180° and 360°.



As well as the names for different angles, you should also know these important angle facts:



Angles on a straight line add up to 180°.



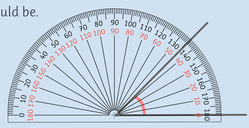
Angles at a point add up to 360°

Vertically opposite angles are equal.

To measure angles, we use a handy tool called a **protractor**. To measure an angle, place the protractor over it so that the **middle point of the protractor** lines up with the **point of the angle.**

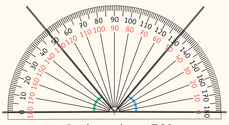
The **o line on the protractor** should also line up with the **bottom line of the angle**.

It's always a good idea to estimate the size of an angle first so that you have an idea of what the answer should be.



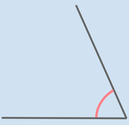
Watch out!

Don't forget to use the correct scale when you're measuring angles from the 0 line on a protractor. If the angle opens to the **right side** of the protractor, use the **inside scale**. If the angle opens to the **left side** of the protractor, use the **outside scale**.


Both angles = 50°

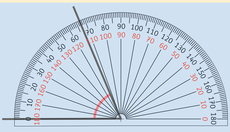
Let's see this in action...

You need to measure this angle: you've been given a protractor to help you.



1) First, it's a good idea to estimate the angle. It's smaller than a right angle, so it will measure between 0° and 90°. It looks closer to 90° than 0°, so it might be around 70°.

2) Next, take your protractor and line it up with the angle.

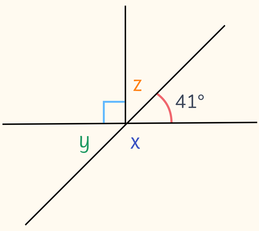


3) Make sure you're using the right scale. This angle opens to the left, so we're going to look at the outside scale.

4) Remember to look closely at the scale to get an accurate reading. This angle is 67° so it's very close to our estimate!

Let's look at another question:

You've been given this diagram and you need to work out the size of x, y and z. Use what you know about angles on a straight line, angles on a point and vertically opposite angles to help you.



1) First, let's try to add in as many values as we can, based on what we know about angles. We can see that one of the angles is a right angle because of the square symbol. A right angle is 90°. We can also see that y is vertically opposite the angle measuring 41°. Vertically opposite angles are equal, so y = 41° too.

2) Next, we can calculate the size of x based on what we know about angles on a straight line.

y + x = 180°

41° + x = 180°

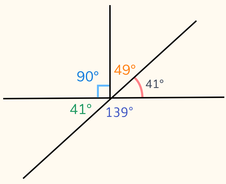
x = 139°

3) Now that we have all of the missing angles except for z, let's use what we know about angles around a point to calculate the size of z.

90° + 41° + 139° + 41° + z = 360°

311° + z = 360°

z = 49°



Excellent work!

x = 139° and is an obtuse angle

y = 41° and is an acute angle

z = 49° and is an acute angle too!

Tips!

Sometimes, you'll need to measure an angle with a protractor and the bottom of the angle doesn't line up with 0 on the protractor. Don't worry! You can use the inside or outside scale and you just need to subtract the smaller number from the larger number. And voila! You've got the size of your angle.