Did you know?

Without parallel lines, our buildings would be wobbly and trains would never be able to make their journey. The longest parallel line is the equator: if we take it to be a map line and don't think about changes in altitude etc., the latitude line cuts the earth in half.

Pytahagoras is perhaps a mathematician who you have heard of. He is celebrated by some as the first "real" mathematician. However, there are some who believe that the theorems named after him were actually solved by his followers. When Hippasus, a student and follower of Pythagoras, tried to find the value of $\sqrt{2}$, he realised it couldn't be written as a fraction, meaning there might be a whole new set of numbers, later known as irrational numbers. This was so challenging to the established way of thinking that Hippasus was drowned for his work!

The Egyptians needed to use a primitive form of trigonometry in order to build the pyramids. Can you imagine building the pyramids without a calculator or a computer?

PiXL© Maths

"Triangles always look the same"
**Incorrect because..**
Which of these are triangles?

ALL OF THEM! The third one is perhaps the one we are most used to seeing but be careful, the orientation doesn't change the fact it is still a triangle.

## KS3 Spine
Geometry

Angle facts
You need to know which angle fact to use and how to **explain why** you have picked a particular fact. Sometimes more than one rule could be applied. Watch out though for questions that catch you out. e.g. Find the missing angle **a** and explain why.

85^0 a
120^0
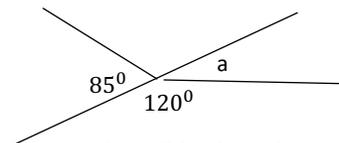
a is **NOT 85^0** , lots of people will look at this and think that a is opposite the 85^0 so must be the same. The rule is about them being **vertically** opposite. We would have to use the fact about angles on a straight line here to calculate a.

"The bigger the lines the bigger the angle"
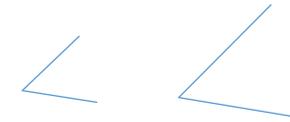
Both of these angles are the same size- Measure them using a protractor!
Angles are a measure of **turn.** The length of the line doesn't affect the magnitude of the angle.

"Parallel lines have to be the same length"

This isn't true, parallel lines remain the same distance apart but they don't have to be the same length.

Using your protractor

Do you know how to use a protractor? There are two scales. A common mistake is to use the wrong one.
BEFORE you measure an angle, look at it and estimate how big it will be. Is it **acute- less then 90^0**
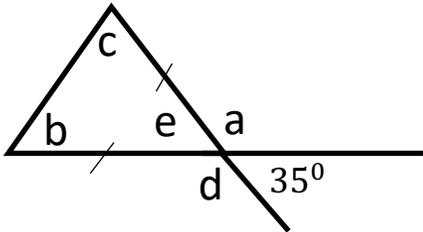**Obtuse – greater than 90^0 but less than 180^0**
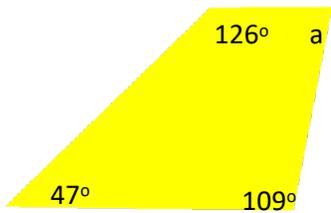**Reflex- greater than 180^0 but less than 360^0**
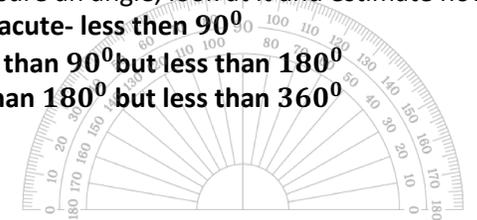
Test Me!

Each question matches the checklist of things you should be able to do as part of the basics for this topic.

1. Find the missing angles and explain why. If you can do this, can you find another way? Do you have to do them in alphabetical order?
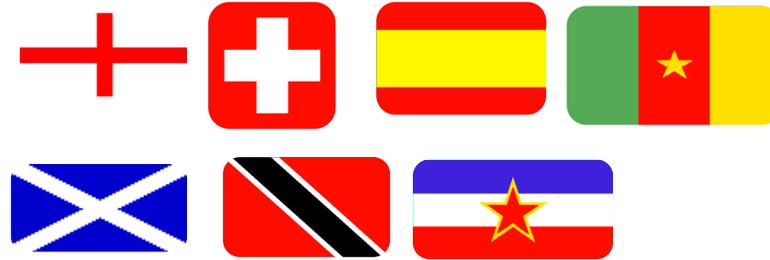

2. Find the missing angles and explain why.

3. Write a description of a parallelogram without drawing one.

4. On a coordinate grid, plot the following coordinates.
$(1,1), (3,7), (8,5)$

5. Plot one more point on your grid to make a trapezium. Now translate this shape $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

Challenge

1. Which of the flags have exactly two lines of symmetry?

2. Take a square piece of paper and fold along the diagonals. Unfold and mark any angles which are the same. Now try folding along lines of symmetry. Repeat for a rectangle. Are there the same number of equal angles in the triangles? Why? What if the starting shape was a regular pentagon? Hexagon?

3. Calculate the missing angles and give reasons.
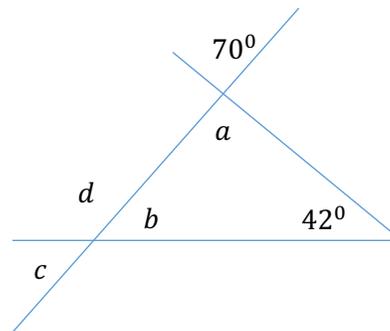
Extend
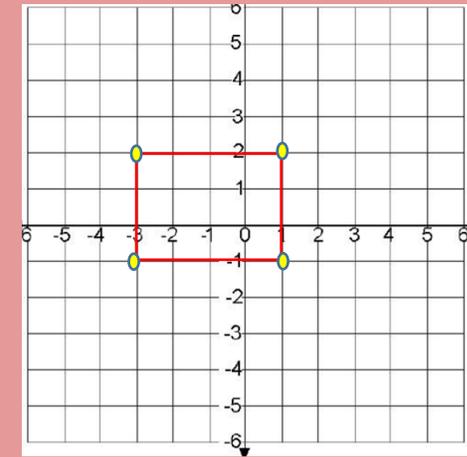
1. Translate the shape $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

2. What are the coordinates of the new vertices?

3. Which coordinates do you need to change on the original shape to make it a parallelogram?

4. Which coordinates do you need to change on the original shape to make it a rhombus?

Maths KS3 **Geometry**