

Geometrical Reasoning

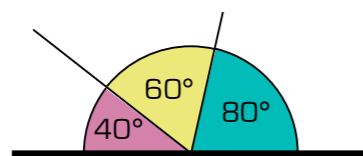
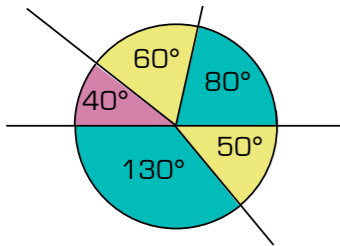
Read this together ▶▶▶

The Elements

- The most famous maths book ever written is called *The Elements*.
- It was written by Euclid of Alexandria (in Egypt) around 2300 years ago.
- The first six books are about geometry and look at lines, shapes and angles.

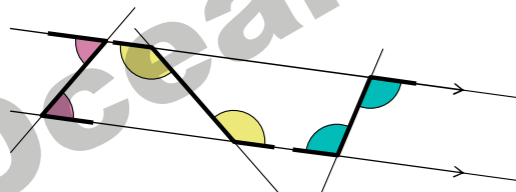
Measuring angles

- There are **360°** in a full turn
- There are **180°** in a half turn (straight line)

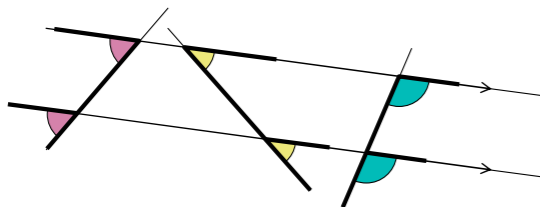


Parallel lines

- When a straight line crosses two **parallel** lines it makes a **Z** shape (**alternate angles**).
- Angle pairs in **Z** shapes are **equal**.



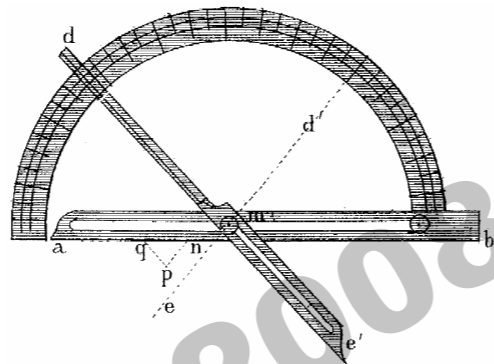
- When a straight line crosses two **parallel** lines it makes an **F** shape (**corresponding angles**).
- Angle pairs in **F** shapes are **equal**.



Now turn the page and try the activities ▶▶▶

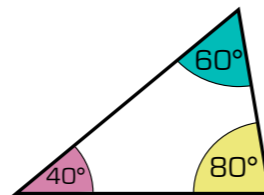
OBJECTIVE

In this activity you will use correct notation for angles and lines. You will use angles around a point and on a straight line. You will work with, alternate, corresponding (F), and alternate (Z) angles.

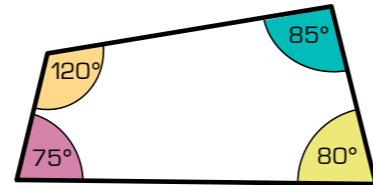


REMEMBER

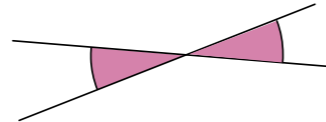
Angles in a **triangle** add up to **180°**



Angles in a **quadrilateral** add up to **360°**



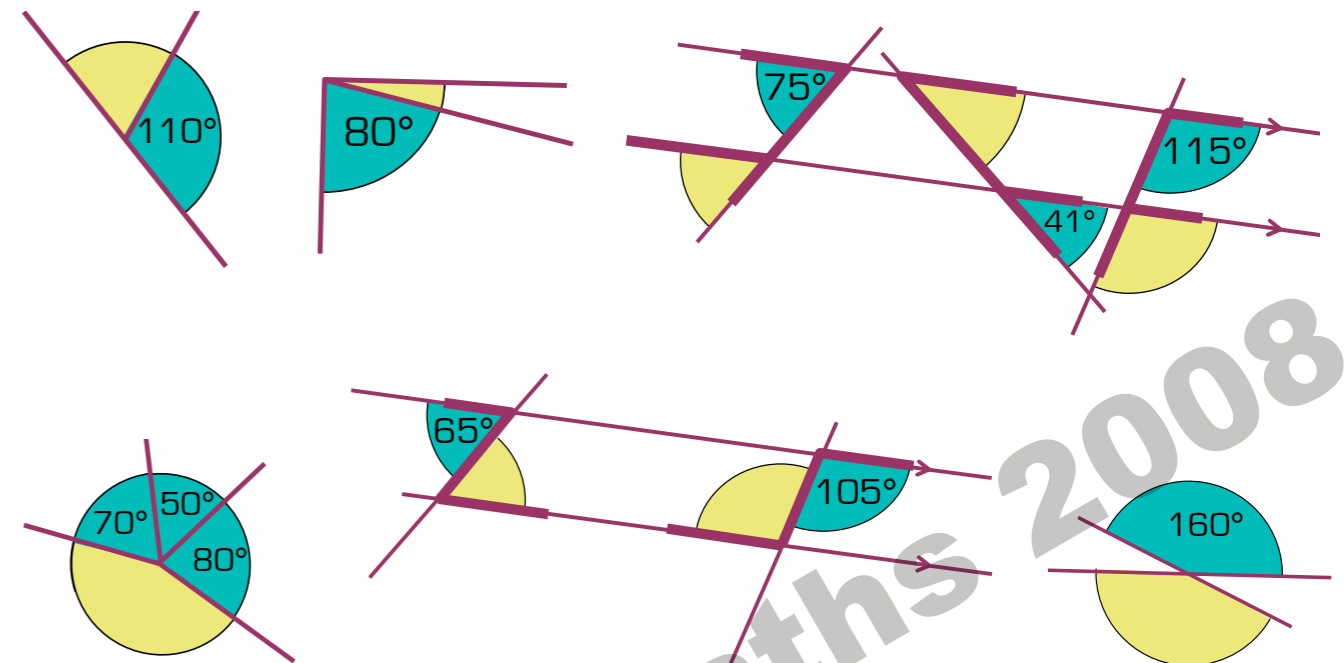
Opposite angles are equal at the crossing of two straight lines.



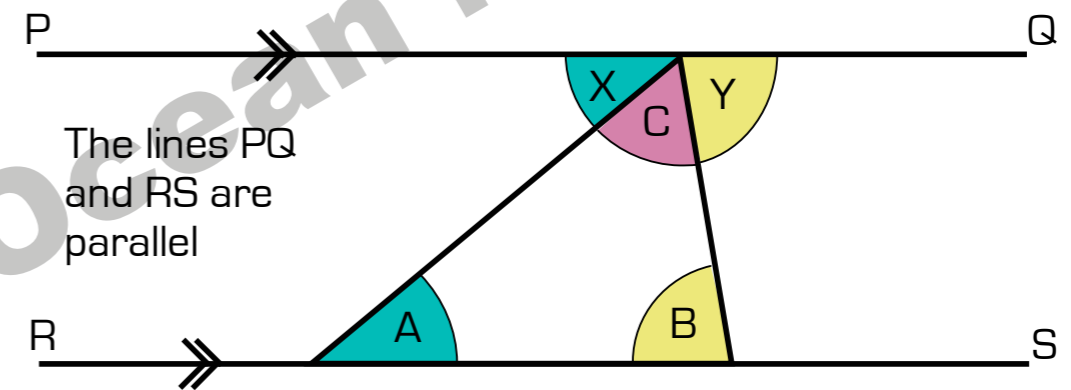
ACTIVITY 1

Read this and do the questions together:

- 1 Write the size of the yellow angles onto the diagrams.



- 2 This is how we **prove** that angles in a triangle add up to 180°:



Explain why: $X + C + Y = 180^\circ$ (equation 1)

Explain why: $A = X$

Explain why: $B = Y$

If $A = X$ and $B = Y$ then we can swap A for X and B for Y in Equation 1

This means that $A + C + B = 180^\circ$

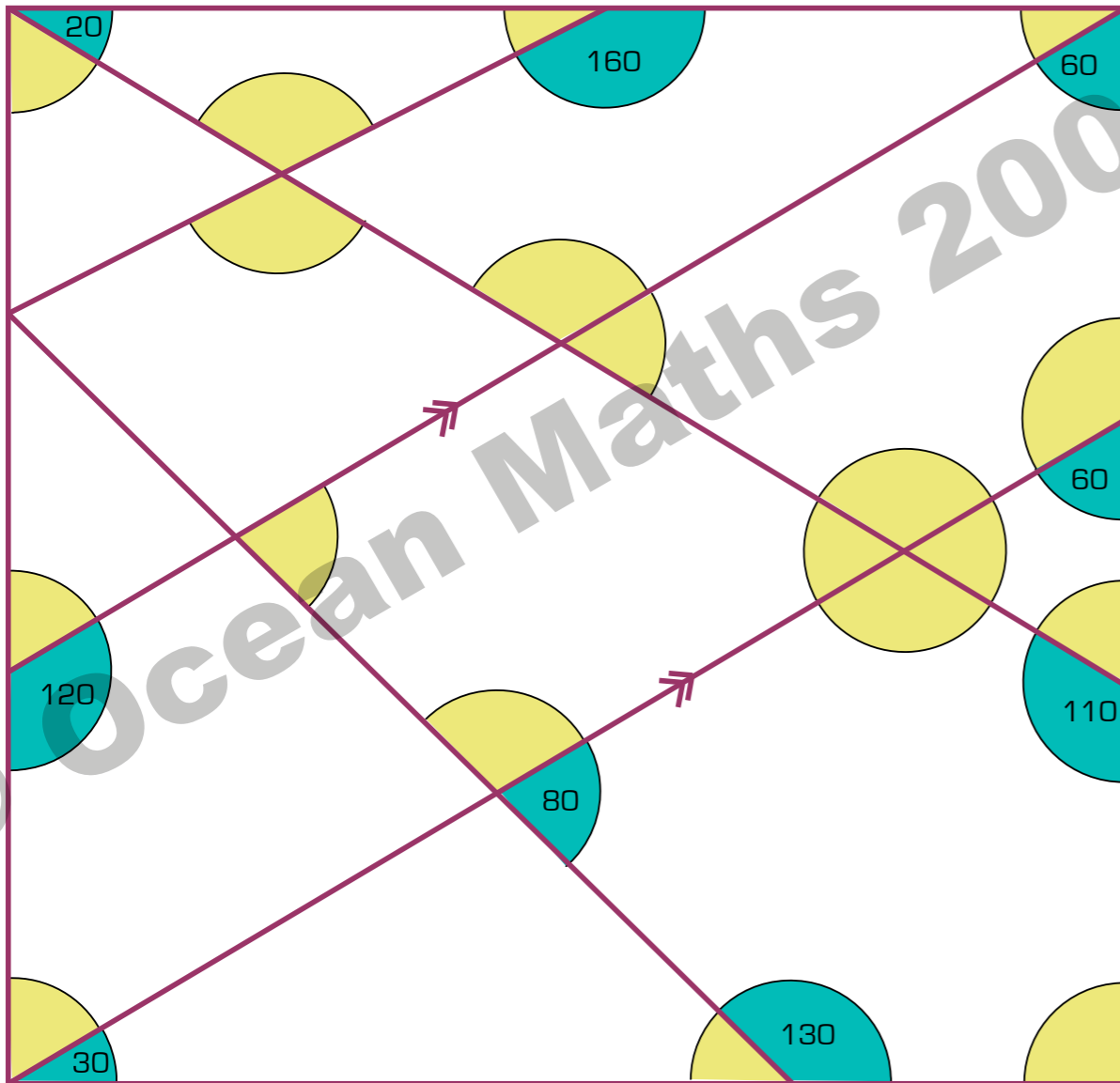
This **proves** that the angles in any triangle always add up to 180°

Play this game together:

ACTIVITY 2

Angle Tangle

- Take it in turns to choose a yellow angle.
- **Write the size of the angle on the diagram** and in your list (at the bottom of this page).
- At the end of the game, add up all the angles you found.
- The winner is the one with the highest total.



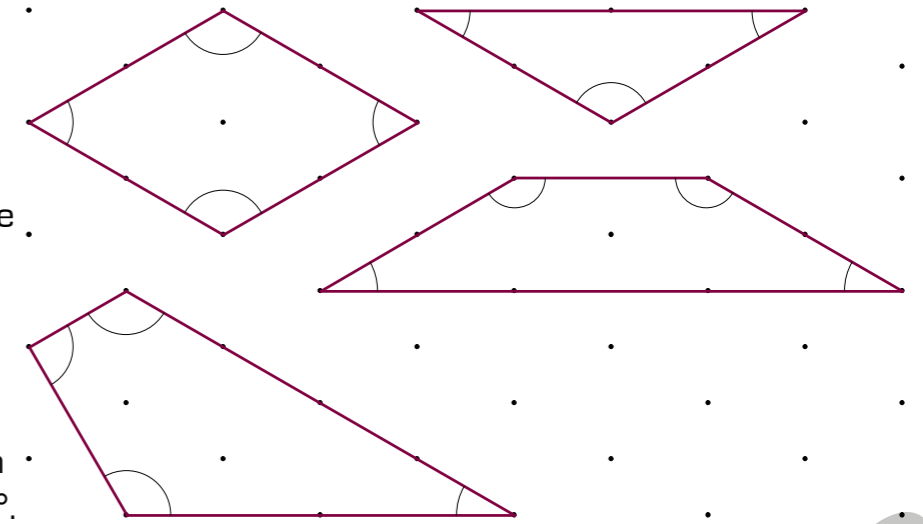
Your angles _____

Your partner's angles _____

ACTIVITY 3

Read this and do the questions together:

- All the angles of an equilateral triangle are equal to 60° .
- Find the angles in the shapes on this grid. Write their sizes onto the diagram.
- Check that the sum of the angles in each quadrilateral is 360° .



RESEARCH ACTIVITY

Look these words up in a dictionary or an encyclopaedia:

- Geometry
- Corresponding, alternate, supplementary, complementary
- [Mathematical] Proof

Play kung fu and tank attack at:

<http://www.bbc.co.uk/keyskills/flash/kfa/kfa.shtml>

<http://www.what2learn.com/content/samples/maths/parallel.htm>

Explore geometry at:

<http://www.mathsnet.net/geometry/index.html>

Teacher Comment

Name	Maths set	Date						
Maths partner	Maths teacher							
Feedback – please circle	Partner			Student				
	Not at all		Very much	Not at all		Very much		
1. Did you enjoy the homework?	1	2	3	4	1	2	3	4
2. Did you find it difficult?	1	2	3	4	1	2	3	4
3. How much did you discuss the homework?	1	2	3	4	1	2	3	4
4. Who talked the most?	1	2	3	4	1	2	3	4