# Y7 Developing Geometric Reasoning

## What do I need to be able to do?

**By the end of this unit you should be able to:**

- Understand/use the sum of angles at a point
- Understand/use the sum of angles on a straight line
- Understand/use equality of vertically opposite angles
- Know and apply the sum of angles in a triangle
- Know and apply the sum of angles in a quadrilateral

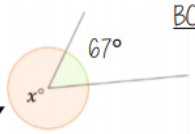
## Keywords

**Vertically Opposite:** angles formed when two or more straight lines cross at a point
**Interior Angles:** angles inside the shape
**Sum:** total, add all the interior angles together
**Convex Quadrilateral:** a four-sided polygon where every interior angle is less than 180°
**Concave Quadrilateral:** a four-sided polygon where one interior angle exceeds 180°
**Polygon:** A 2D shape made with straight lines
**Scalene triangle:** a triangle with all different sides and angles
**Isosceles triangle:** a triangle with two angles the same size and two angles the same size
**Right-angled triangle:** a triangle with a right angle

## Sum of angles at a point

The sum of angles around a point is 360°

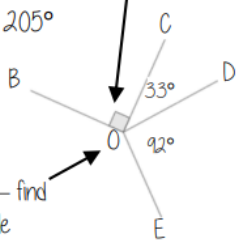

360° - 67° = 293°




**Find angle BOE**

90° + 33° + 92° = 205°
360° - 205°
BOE = 155°

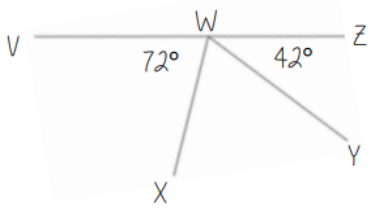
Angle notation – 90°




Angle notation – find this missing angle

## Sum of angles on a straight line

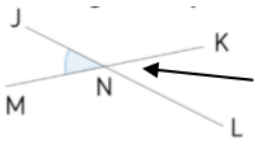
Adjacent angles that share a common point on a line add up to 180°




**Find angle XWY**

72° + 42° = 114°
180° - 114° = 66°

## Vertically opposite angles

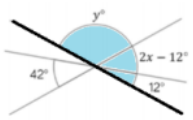


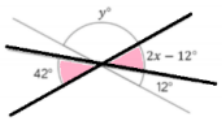

Angle JNM is vertically opposite to angle KNL

JNM = KNL

**Vertically opposite angles are the same**

Other angle rules still apply
Look for straight line sums and angles around a point

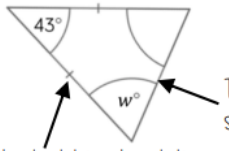



Form equations with information from diagrams:
2x - 12 = 42
2x = 54
x = 27°

## Sum of angles in triangles

**Sum of interior angles in a triangle = 180°**




The two base angles will be the same size

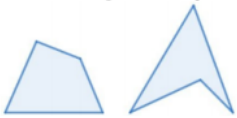
Look at triangle notation
This indicates an isosceles triangle
∴ 180 - 43 = 137
137 ÷ 2 = 68.5°

A triangle can only have ONE right angle

Have a go!
Tearing the corners from triangles forms a straight line which is therefore 180°

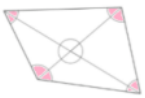
## Sum of angles in quadrilaterals

**Sum of interior angles in a quadrilateral = 360°**

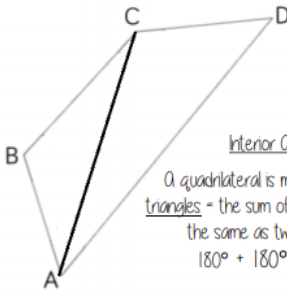


Convex Quadrilateral

Concave Quadrilateral



Interior angles are those that make up the perimeter (outline) of the shape

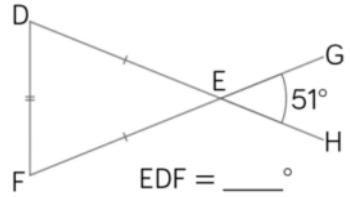



Interior Angles

A quadrilateral is made up of two triangles - the sum of interior angles is the same as two triangles:
180° + 180° = 360°

## Angle Problems

Split up the problem into chunks and explain your reasoning at each point using angle notation




Keep working out clear and notes together

1. Angle DEF = 51° because it is a vertically opposite angle DEF = GEH
2. Triangle DEF is isosceles (triangle notation) ∴ EDF = EFD and the sum of interior angles is 180°
   180° - 51° = 129°  129° ÷ 2 = 64.5°
3. Angle EDF = 64.5°