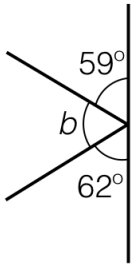
Knowledge Organiser: Angles, Polygons and Parallel lines

What you need to know:

Straight lines and around a point

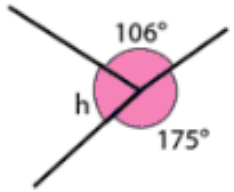


To calculate b:

62° + 59° = 121°

180° - 121° = 59°

Add the angles we know together first then subtract from 180°.



To calculate h:

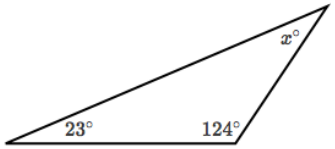
175° + 106° = 281°

360° - 281° = 79°

Add the angles we know together first then subtract from 360°.

Triangles

Angles in a triangle add up to 180°.

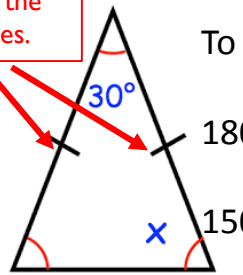


To calculate x:

23° + 124° = 147°

180° - 147° = 33°

This means that these 2 sides are equal and the 2 angles at the end of the sides.



Subtract from 180°.

To calculate x:

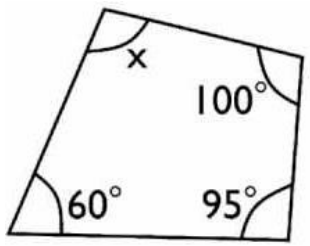
180° - 30° = 150°

150° ÷ 2 = 75°

Divide by 2 to calculate 1 angle.

Quadrilaterals

Angles in a quadrilateral add up to 360°.



To calculate x:

60° + 100° + 95° = 255°

360° - 255° = 105°

Add the angles we know together first then subtract from 360°.

Key Terms:

Quadrilateral: A 2D shape with four sides.
Polygon: A 2D shape.
Regular Polygon: A shape where all of the sides are equal length.
Irregular Polygon: A shape where all of the sides are not equal lengths.
Isosceles: A triangle that has 2 equal sides and 2 equal angles.
Equilateral: A triangle where all of the sides and angles are equal.
Vertically opposite: The 2 angles that are facing each other are equal where 2 lines cross.
Parallel: Always the same distance apart and never toughing.
Perpendicular: At right angles (90^0).
Interior angle: An angle inside a shape.
Exterior angle: The angle between any side of a shape, and a line extended from the next side.

Hegarty maths clip numbers

Angle facts: 477 - 480, 485 – 491, 812 - 814

Parallel lines: 481 - 483

Interior and Exterior: 560 - 564

You need to be able to:

- Classify quadrilaterals and triangles by their geometric properties.
- Calculate missing angles in triangles, quadrilaterals and using the rules of vertically opposite angles.
- Calculate missing angles inside parallel lines and explain using the correct terminology.
- Combine basic angle facts with parallel line facts to solve problems.
- Calculate interior and exterior angles of a regular or irregular polygon and calculate the number of sides.

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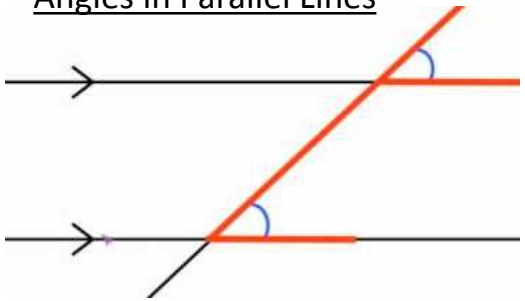
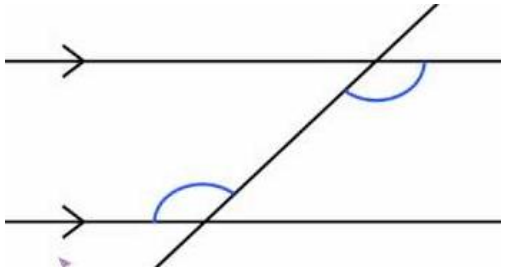
What you need to know:

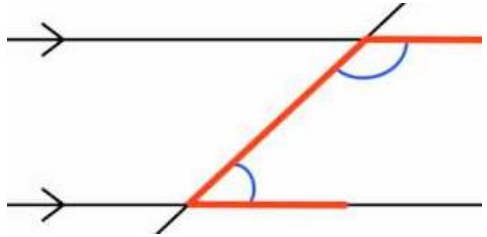
Angles in Parallel Lines



Corresponding angles are equal.



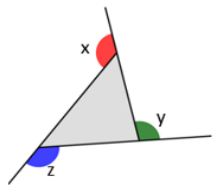
Alternate angles are equal.



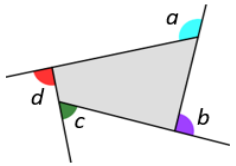
Co-interior angles sum to 180°.

Exterior Angles in Polygons

Exterior angles in a polygon sum to 360°.



x + y + z = 360°



a + b + c + d = 360°

The exterior angle of a regular polygon is calculated using: 360 ÷ n

n = number of sides

Interior Angles in Regular Polygons

Calculate the size of one interior angle in a pentagon.

Step 1 – Calculate the sum of the interior angles

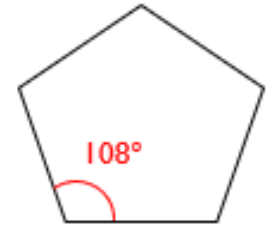
Sum of interior angles = (n – 2) x 180

n = number of sides

Step 2 – Divide by the number of sides

(5 – 2) x 180 = 540

540 ÷ 5 = 108°



Angles in Polygons

Sometimes you are asked to calculate the number of sides a regular polygon has.

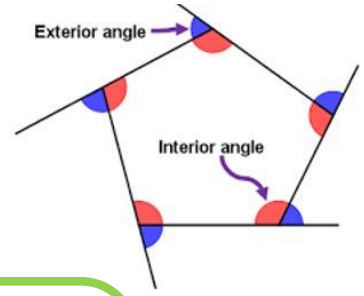
Step 1 – Calculate the size of the exterior angle

Interior angle + exterior angle = 180°

Step 2 – Divide by the number of sides

(5 – 2) x 180 = 540

540 ÷ 5 = 108°



Interior and exterior angles key formulae:

Sum of the Interior Angles	$180(n-2)$
Sum of the Exterior Angles	Always 360°!
Each Interior Angle	$\frac{180(n-2)}{n}$
Each Exterior Angle	$\frac{360°}{n}$