Year 8 - Unit 11: Angles

Learning Journey:

Prior Learning

- Identify and measure angles using a protractor.
- Use angle facts for straight lines, around a point and vertically opposite angles.

Next Steps

- Apply angle facts to circle theorems and geometric proofs.
- Solve more complex GCSE geometry problems involving angles, polygons and constructions.

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

- Calculate missing angles in quadrilaterals, polygons and parallel lines using angle rules.
- Solve multi-step problems by combining several angle facts and justifying their reasoning.

Keywords:

Quadrilateral – A shape with four sides.
Parallel lines – Lines that never meet.
Alternate angles – Equal angles on opposite sides of a transversal.
Corresponding angles – Equal angles in matching positions.
Co-interior angles – Angles on the same side of a transversal that add to 180°.
Exterior angle – An angle outside a polygon formed by extending a side.

Angles in quadrilaterals

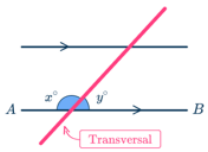
		Properties			
Quadrilateral	Image	Sides	Angles	Diagonals	Symmetry
Square		• Four equal sides • Opposing sides are parallel	• All equal angles (90°)	• Bisect each other • Same length • Meet at 90°	• Four lines of symmetry • Rotational symmetry of order 4
Rectangle		• Two pairs of equal sides • Opposing sides are parallel	• All equal angles (90°)	• Bisect each other • Same length	• Two lines of symmetry • Rotational symmetry of order 2
Parallelogram		• Two pairs of equal sides • Opposing sides are parallel	• Two opposing pairs of equal angles	• Bisect each other	• No lines of symmetry • Rotational symmetry of order 2
Rhombus		• Four equal sides • Opposing sides are parallel	• Two opposing pairs of equal angles	• Bisect each other • Meet at 90°	• Two lines of symmetry • Rotational symmetry of order 2
Kite		• Two pairs of equal sides	• One opposing pair of equal angles	• Meet at 90°	• One line of symmetry • No rotational symmetry
Trapezium		• One pair of parallel sides	• No equal angles	• No special properties	• No lines of symmetry • No rotational symmetry
Isosceles Trapezium		• One pair of equal sides • One pair of parallel sides	• Two pairs of equal angles	• Bisect each other • Same length	• One line of symmetry • No rotational symmetry
Irregular		• One or more sides of unequal length	• One or more angles of unequal size	• No special properties	• No lines of symmetry • No rotational symmetry

Angles in parallel lines

Parallel angles are angles that are created when a pair of parallel lines are intersected by a third line called a **transversal**.

You can use the information given in the diagram to find any angle around the intersecting transversal.

To do this, use three facts about angles in parallel lines:
Alternate Angles, **Co-Interior Angles**, and **Corresponding Angles**.



Alternate interior angles are equal	Corresponding angles are equal	Co-interior angles add up to 180°
Sometimes called 'Z angles'	Sometimes called 'F angles'	Sometimes called 'C angles'
		

Angles in polygons