Year 8 Angles and Constructions – Revision Notes

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Year 8 · Maths · Angles, Polygons and Constructions · Key ideas and worked examples

For grown-ups and learners: read each part and try the worked example. Then work through the sheets: Foundation, Developing, Challenge, then Mixed Practice to revise everything. Show your working: it earns marks in tests and helps you spot mistakes.

1. The quadrilateral family

Quadrilaterals form a **hierarchy**. A square is a special rectangle **and** a special rhombus. Rectangles and rhombuses are special parallelograms. In this course a trapezium has **exactly one** pair of parallel sides, and a kite has two pairs of equal adjacent sides.

Example: Name the quadrilateral that has exactly one pair of parallel sides.
→ Match the properties: a trapezium
Answer: a trapezium

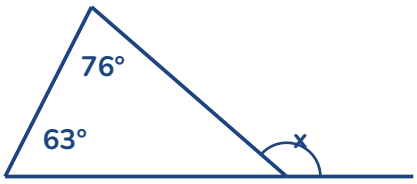
2. Regular polygons

A regular polygon with n sides has **n lines of symmetry** and **rotational symmetry of order n**. For example, an octagon that is regular has 8 sides, 8 lines of symmetry and order 8.

3. The exterior angle of a triangle

Extend one side of a triangle to make an **exterior angle** x. Angles on a straight line give x + b = 180°, and the angles in the triangle give a + b + c = 180°. So **x = a + c**: the exterior angle equals the sum of the two interior opposite angles.

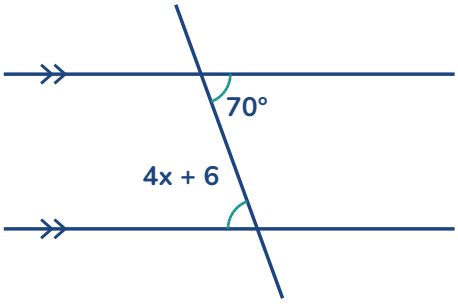
Example: In triangle ABC, angle A = 63° and angle C = 76°. Side AB is extended beyond B. Find the exterior angle x at B.
→ The exterior angle equals the sum of the two interior opposite angles
→ x = 63 + 76 = 139°
Answer: x = 139°



4. Parallel lines with algebra

Alternate and corresponding angles are equal, vertically opposite angles are equal and angles on a straight line add up to 180°. If an angle 2x + 10 is alternate to 70°, then 2x + 10 = 70, so x = 30. Always give the reason.

Example: The lines marked with arrows are parallel. Write an equation and find x. Give a reason.
→ Alternate angles are equal: 4x + 6 = 70
→ 4x = 64
→ x = 16
Answer: x = 16 (alternate angles are equal)



5. Constructions

Use a ruler and compasses. To **bisect a line**, draw equal arcs (more than half the length) from both ends; the line through the crossing points is the perpendicular bisector and passes through the midpoint. For an **angle bisector**, draw an arc from the vertex, then equal arcs from where it meets the arms, and join the vertex to the crossing point. Leave your construction arcs showing.

Think like a mathematician: test a few cases (**specialising**), look for the rule that always works (**generalising**), and explain why you are sure (**convincing**). When you check someone's working, say what is wrong and how to **improve** it.

Common mistakes: using 180° − (a + c) for the exterior angle. Calling every rhombus a square. Rubbing out construction arcs. Forgetting the reason with each angle.