Year 8 Circles, Area and Volume – Revision Notes

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Year 8 · Maths · Circles, Area and Volume · 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. Circumference and pi

For every circle, circumference ÷ diameter is the same number, **π** (pi) ≈ 3.14. So **C = πd** or **C = 2πr**. A circle with diameter 10 cm has circumference 3.14 × 10 = **31.4 cm**.

Example: Find the circumference of a circle with radius 20 cm. Use π = 3.14.
→ C = πd = 2πr
→ = 3.14 × 40 = 125.6 cm
Answer: 125.6 cm

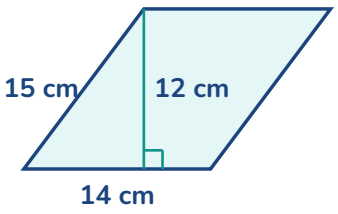
2. Miles and kilometres

A kilometre is about **5/8 of a mile**, and a mile is about **1.6 km**. So 40 km ≈ 40 × 5/8 = 25 miles, and 30 miles ≈ 30 × 1.6 = 48 km.

3. Parallelograms and trapezia

Cut a triangle off one end of a parallelogram and move it to the other end: it makes a rectangle, so **area = base × perpendicular height**. Two identical trapezia fit together to make a parallelogram, so the area of a trapezium is **½(a + b)h**, where a and b are the parallel sides.

Example: A parallelogram has a base of 14 cm, a perpendicular height of 12 cm and sloping sides of 15 cm. Find its area.
→ Area of a parallelogram = base × perpendicular height
→ 14 × 12 = 168 cm^2
Answer: 168 cm^2



4. Solids

Euler's formula connects the vertices, edges and faces of a polyhedron: **V − E + F = 2**. A triangular prism has 6 vertices, 9 edges and 5 faces: 6 − 9 + 5 = 2. The volume of a prism is the **area of its cross-section × its length**. Its **surface area** is the total area of all its faces. Views can be drawn to scale: the **front view**, **side view** and **top view**. Divide every real length by the scale, so with 1 cm to 2 m, a 6 m by 4 m floor is drawn 3 cm by 2 cm.

Example: A triangular prism is 9 cm long. Its triangular end has a base of 8 cm and a perpendicular height of 2 cm. Find its volume.
→ Area of the triangle: ½ × 8 × 2 = 8 cm^2
→ Volume = area of cross-section × length = 8 × 9 = 72 cm^3
Answer: 72 cm^3

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 the radius in C = πd. Forgetting the ½ in the trapezium formula. Using a sloping side instead of the perpendicular height. Writing V + E + F = 2.