

GRADE 11 STUDY GUIDE | 2024

Measurement and Maps

Mathematical Literacy

1. Units of Measurement

- Length: mm, cm, m, km. Conversions: $10\text{ mm} = 1\text{ cm}$; $100\text{ cm} = 1\text{ m}$; $1000\text{ m} = 1\text{ km}$
- Mass: mg, g, kg, t. Conversions: $1000\text{ mg} = 1\text{ g}$; $1000\text{ g} = 1\text{ kg}$; $1000\text{ kg} = 1\text{ t}$
- Volume/capacity: ml, l, kl. Conversions: $1000\text{ ml} = 1\text{ l}$; $1000\text{ l} = 1\text{ kl}$
- Time: seconds, minutes, hours. $60\text{ s} = 1\text{ min}$; $60\text{ min} = 1\text{ hr}$; $24\text{ hr} = 1\text{ day}$
- Temperature: Celsius (deg C) is standard in SA; Fahrenheit used in USA

2. Perimeter, Area and Volume

Perimeter: sum of all sides**Area of rectangle = length x width****Area of triangle = (base x height) / 2****Area of circle = $\pi \times r^2$** **Volume of rectangular prism = length x width x height****Volume of cylinder = $\pi \times r^2 \times \text{height}$** **$1\text{ m}^2 = 10\,000\text{ cm}^2$; $1\text{ m}^3 = 1\,000\,000\text{ cm}^3$; $1\text{ litre} = 1000\text{ cm}^3$** **Example: A cylindrical water tank has radius 0.8 m and height 1.5 m. Find capacity in litres.**Volume = $\pi \times 0.8^2 \times 1.5 = 3.14159 \times 0.64 \times 1.5 = 3.016\text{ m}^3$ $= 3.016 \times 1000 = 3016\text{ litres}$

3. Scale and Maps

Scale ratio: 1 : n means 1 unit on map = n units in reality**Actual distance = Map distance x Scale denominator****Map distance = Actual distance / Scale denominator****Example: Scale 1:50 000. Two towns are 4.5 cm apart on the map.**Actual distance = $4.5\text{ cm} \times 50\,000 = 225\,000\text{ cm} = 2.25\text{ km}$

4. Time, Speed and Distance

Distance = Speed x Time

$$\text{Speed} = \text{Distance} / \text{Time}$$

$$\text{Time} = \text{Distance} / \text{Speed}$$

Convert km/h to m/s: divide by 3.6

5. Reading Plans and Elevations

- Floor plan: bird's eye view (looking down); shows layout of rooms
- Elevation: front, back or side view; shows heights
- Scale on plans: e.g. 1:100 means 1 cm on plan = 100 cm (1 m) in reality
- Read dimensions carefully; note which unit is used
- Calculate area of rooms to find floor tiles, paint, carpet needed