

UNIT 11 *Units of Measurement*

Introduction to SIM

Learning objectives

The work in this unit is an important foundation for the next three units. After completing this unit of STUDENT INSTRUCTIONAL MATERIAL (SIM) you should be able to

- use and apply units of measure for length, mass and volume
- convert between metric measures
- understand how to calculate upper and lower bounds for measurements
- estimate areas
- approximate between SI units and basic Imperial units (not examined).

Key points and principles

- $1 \text{ km} = 1000 \text{ m}$
 $1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$
 $1 \text{ cm} = 10 \text{ mm}$
- $1 \text{ tonne} = 1000 \text{ kg}$
 $1 \text{ kg} = 1000 \text{ g}$
- $1 \text{ litre} = 1000 \text{ ml}$
 $1 \text{ m}^3 = 1000 \text{ litres}$
 $1 \text{ cm}^3 = 1 \text{ ml}$
- Measurements are only approximations to actual lengths; for example, a measurement of 7 cm to the nearest cm means that
$$6.5 \text{ cm} \leq \text{actual length} < 7.5 \text{ cm}$$
- Conversions between SI units and Imperial units are approximations and are not exact.
Note that section 11.4 is marked : see note at foot of this page.

 denotes that the topic is not on the current CXC/CSEC Mathematics syllabus and therefore not examined, but is of relevance to the content of the Unit.

Introduction to SIM

Facts to remember

- $1 \text{ km} = 1000 \text{ m}$
 $1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$
 $1 \text{ cm} = 10 \text{ mm}$
- $1 \text{ tonne} = 1000 \text{ kg}$
 $1 \text{ kg} = 1000 \text{ g}$
- $1 \text{ litre} = 1000 \text{ ml}$
 $1 \text{ m}^3 = 1000 \text{ litres}$
 $1 \text{ cm}^3 = 1 \text{ ml}$
- 5 miles is approximately 8 km (not examined)
- 1 foot is approximately 30 cm (not examined)

Glossary of terms

SI units length (mm, cm, m, km)
 mass (g, kg)
 volume (ml, litre)

Upper and lower bounds For example, 9 mm, measured to the nearest mm, means that

$$8.5 \leq \text{actual length} < 9.5$$
Here 8.5 is the lower bound and 9.5 is the upper bound

Imperial units $\left\{ \begin{array}{l} \text{length (inch, foot, yard, mile)} \\ \text{mass (ounce, pound, stone)} \\ \text{volume (pint, gallon)} \end{array} \right\}$ (not examined)

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