



Objective

- Understand and use fundamental quantities and units in the SI system.



Key Facts

Base Units:

QUANTITY	BASE UNIT	ABBREVIATION
time		
length		
mass		

Derived units:

QUANTITY	UNIT	ABBREVIATION
velocity	metres per second	m/s or ms ⁻¹
acceleration	metres per second squared	m/s ² or ms ⁻²
force	newton	N
moment	newton metre	Nm

Prefixes:

NAME	SYMBOL	MAGNITUDE
kilo	k	10 ³
centi	c	0.01
milli	m	0.001
micro	μ	10 ⁻⁶

1 tonne = 1000 kg



DISTANCE VS DISPLACEMENT

- Total distance** measures how far an object has **travelled in total**.
 - It does not take into account the direction of travel.
- Displacement** is the distance of an object from its **initial position**.
 - It takes into account direction of travel.



VELOCITY VS SPEED

- Velocity** is the **rate of change of displacement**.
 - It takes into account direction of travel.
- Speed** is the **magnitude of velocity**.
 - It does **not** take into account the direction of travel.



ACCELERATION

- Acceleration** is the **rate of change of velocity**.
 - It takes into account the direction of travel.



VECTORS AND SCALARS

- Vectors** quantities have **magnitude** and **direction**.
- Scalar** quantities have **magnitude** only.

▶ **Examples**

2.4e. Use your calculator to convert the following:

- (a) 27 kmh^{-1} into ms^{-1} ,

- (b) 42 cm^3 into litres.

2.4p. Use your calculator to convert the following:

- (a) 32500 cm^3 into m^3 ,

- (b) 500 kmh^{-1} into ms^{-1} .

f(x) AVERAGE VELOCITY / AVERAGE SPEED

$$\text{Av velocity} = \frac{\text{change in displacement}}{\text{time taken}}$$

$$\text{Av speed} = \frac{\text{total distance}}{\text{time taken}}$$

2.5e. Points A , B and C lie on a straight line as shown in the diagram.

A particle travels from A to C in 28 seconds.

- (a) (i) Find the **displacement** of the particle from A .

- (b)(i) Find the **average speed** of the particle.

- (ii) Find the **total distance** travelled by the particle.

- (ii) Find the **average velocity** of the particle.
