IGCSE PHYSICS • EXERCISE SHEET

1.2 Motion

Name: _____ Class: _____ Date: _____ **Total: 11 marks**

Objective

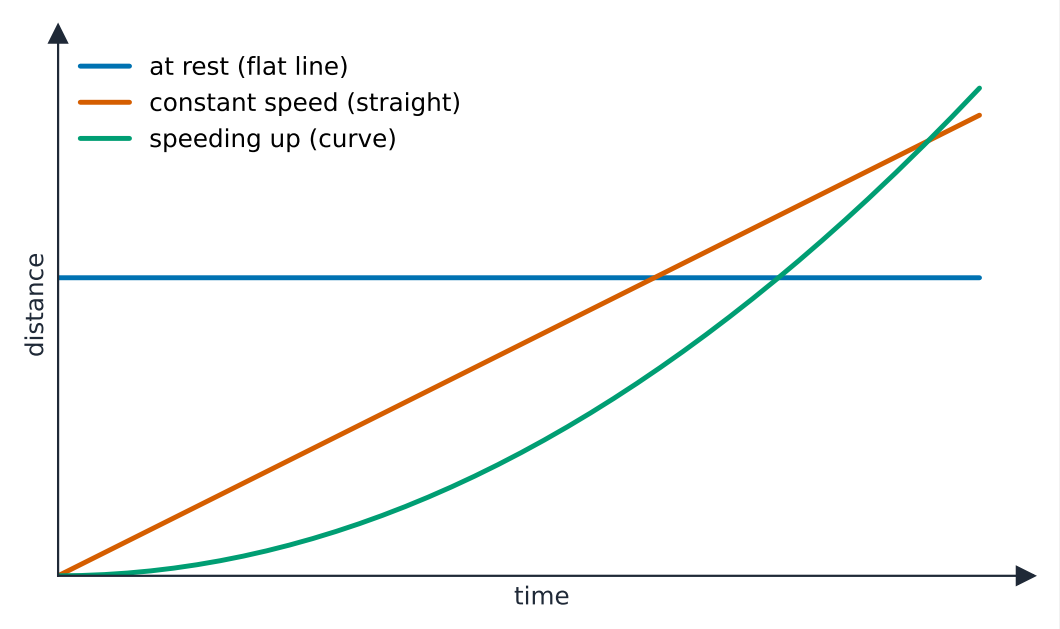
Build the skills to answer exam questions on **motion** 运动—speed, velocity, **acceleration** 加速度, motion graphs, and **terminal velocity** 终极速度.

You must be able to:

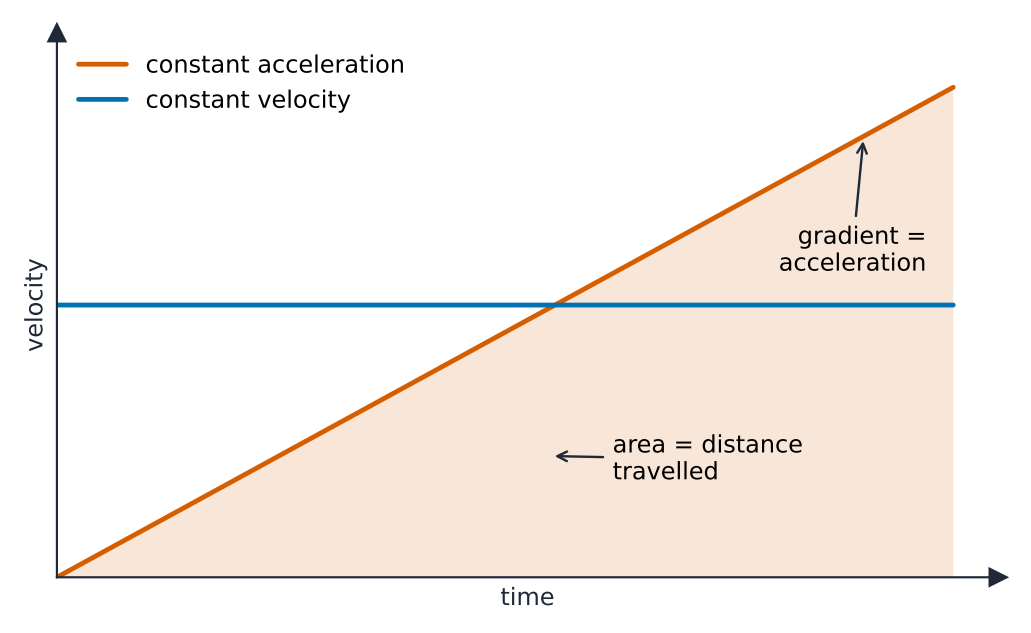
- use $v = \dfrac{s}{t}$ and $a = \dfrac{\Delta v}{\Delta t}$
- read distance–time and speed–time graphs (gradient and area)
- describe falling objects and terminal velocity

1 Worked examples

Graphs and acceleration



Distance–time: flat = at rest, straight slope = constant speed, rising curve = speeding up



Velocity–time: gradient = acceleration, area under the line = distance

Car $8 \to 20$ m/s in 4.0 s: $a = \dfrac{20 - 8}{4.0} = 3.0\ \text{m/s}^2$.

2 Practice

2.1 A runner covers 100 m in 12.5 s. Find the average speed. [2]

2.2 State what the area under a speed–time graph represents. [1]

3 Exam-style questions

3.1 On a distance–time graph, a horizontal (flat) line means the object is: [1]

- **A** accelerating
- **B** at rest
- **C** at constant speed
- **D** decelerating

3.2 A car accelerates uniformly from rest to 24 m/s in 8.0 s.

(a) Find the acceleration. [2]

(b) Find the distance travelled (area under the speed–time graph). [2]

3.3 A skydiver falls and reaches terminal velocity. Explain, in terms of forces, why the speed becomes steady. [3]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **1.2 Motion** past-paper sheet in the Library, or try these in **Practice mode**:

- 0625/21 N25 —Q2 (motion / speed)
- 0625/22 N25 —Q2 (motion graphs)
- 0625/23 N25 —Q3 (acceleration)

Solutions

2.1 $v = \dfrac{100}{12.5} = 8.0$ m/s.

2.2 the distance travelled.

3.1 B. A flat line on a distance–time graph means the distance is not changing —at rest.

3.2 (a) $a = \dfrac{24 - 0}{8.0} = 3.0$ m/s^2.
(b) distance = area = $\frac{1}{2} \times 8.0 \times 24 = 96$ m.

3.3 as the diver speeds up, air resistance increases; when air resistance equals the weight, the resultant force is zero; so there is no acceleration and the speed stays constant (terminal velocity).