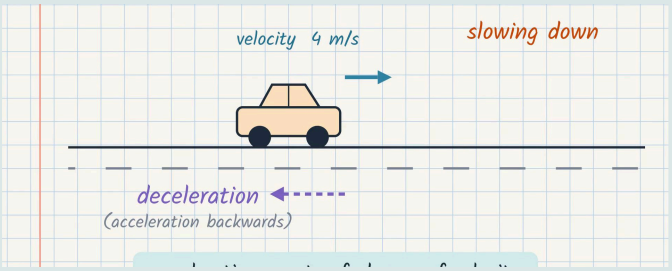
Acceleration

a = Δv / t, velocity–time graphs, gradient and area

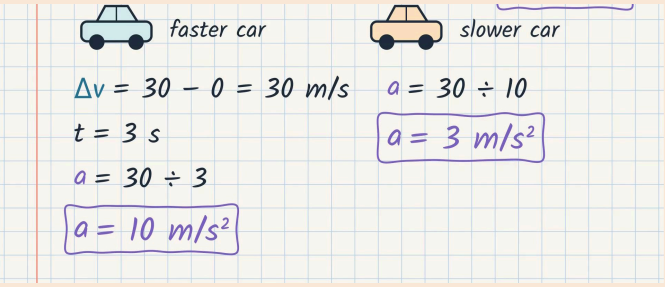
sansara academy
Summary sheet

1 What acceleration is



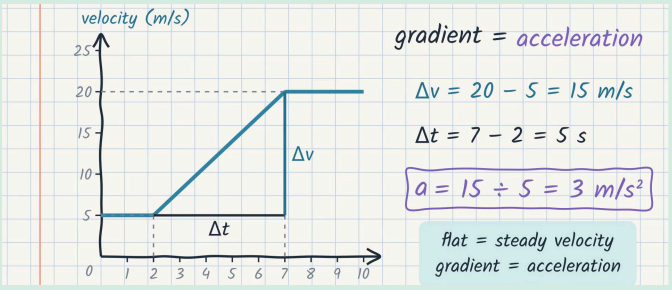
- **Acceleration** is how quickly velocity changes: the rate of change of velocity.
- Slowing down is a change in velocity too. We call it **deceleration**.

2 The equation



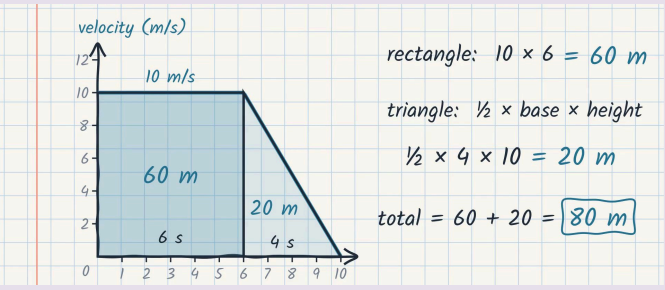
- **a = Δv / t**: acceleration (m/s²) = change in velocity (m/s) ÷ time (s). 3 m/s² means 3 m/s faster every second.
- Δv = final − initial: 4 m/s to 10 m/s is a change of **6 m/s**, not 10. Example: 0 to 30 m/s in 3 s gives a = **10 m/s²**.

3 Velocity–time graphs



- Sloping up = **accelerating**; flat = **constant velocity** (not stopped); sloping down = **decelerating**.
- The **gradient** is the acceleration: (20 − 5) ÷ (7 − 2) = 15 ÷ 5 = **3 m/s²**.

4 Higher: area under the graph



- The **area under a velocity–time graph is the distance travelled**: 10 × 6 = 60 m, plus ½ × 4 × 10 = 20 m, total **80 m**.
- Curved line: count the squares under it, work out the distance one square stands for, then multiply.

a = Δv / t

acceleration = change in velocity ÷ time taken

Exam tip

Read the axes before anything else: is it a distance–time or a velocity–time graph? Then read the starting velocity carefully.

Check yourself

1. A runner speeds up from 2 m/s to 8 m/s in 3 s. What is the acceleration?
2. What does a horizontal line on a velocity–time graph mean?

Answers: 1. a = (8 − 2) ÷ 3 = 2 m/s². 2. constant velocity