

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

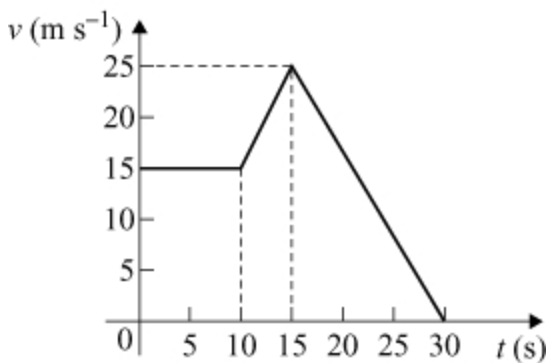
2 Kinematics in one dimension

Exercise A, Question 5

Question:

This velocity-time graph illustrates the motion of an object travelling along a straight line. Calculate the acceleration for each of the following intervals:

- (a) $0 < t < 10$,
- (b) $10 < t < 15$,
- (c) $15 < t < 30$.
- (d) Calculate the distance travelled by the object in the 30 seconds.



Solution:

(a) the velocity is constant so the acceleration is zero.

$$(b) \text{ acceleration} = \frac{(25 - 15)}{(15 - 10)} = 2 \text{ m s}^{-2}$$

$$(c) \text{ acceleration} = \frac{(0 - 25)}{(30 - 15)} = \frac{-25}{15} = -\frac{5}{3} \text{ m s}^{-2}$$

i.e. a deceleration of $\frac{5}{3} \text{ m s}^{-2}$.

$$(d) \text{ distance} = (10 \times 15) + \left[\frac{(15 + 25)}{2} \times (15 - 10) \right] + \left[\frac{1}{2} \times (30 - 15) \times 25 \right]$$

$$= 437.5 \text{ metres}$$