

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 2 Kinematics in one dimension

### Exercise Test yourself, Question 1

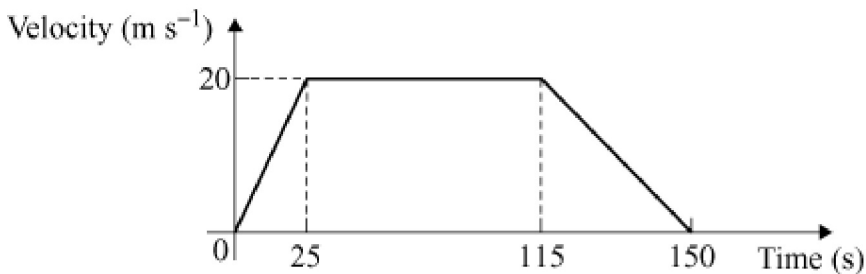
#### Question:

A car accelerates uniformly, along a straight road, from rest to  $20 \text{ m s}^{-1}$  in 25 seconds. It travels at this speed for 1.5 minutes and then slows down, stopping after a further 35 seconds.

- (a) Draw a velocity-time graph and use it to find the total distance travelled by the car.  
 (b) Calculate the acceleration of the car on each stage of its journey.

#### Solution:

(a)



$$\begin{aligned} \text{Distance} &= \left[ \frac{1}{2} \times 25 \times 20 \right] + [ 90 \times 20 ] + \left[ \frac{1}{2} \times 35 \times 20 \right] \\ &= 2400 \text{ metres} \end{aligned}$$

(b) 1st part acceleration =  $\frac{20}{25}$   
 $= 0.8 \text{ m s}^{-2}$

2nd part the speed is constant,  $\therefore$  acceleration is zero.

$$\begin{aligned} \text{3rd part acceleration} &= \frac{-20}{35} \\ &= -\frac{4}{7} \text{ m s}^{-2} \end{aligned}$$

i.e. a deceleration of  $\frac{4}{7} \text{ m s}^{-2}$ .