Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

2 Kinematics in one dimension

Exercise A, Question 6

Question:

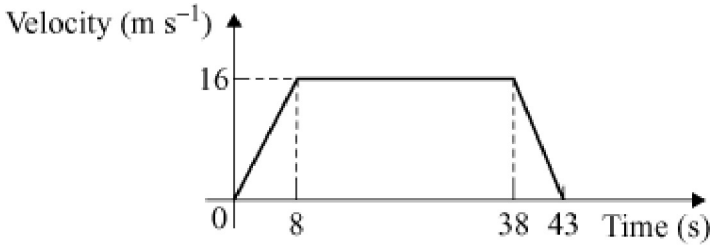
A car moves along a straight road. It accelerates at 2 m s^{-2} from rest until it reaches a speed of 16 m s^{-1}. It then travels at this speed for 30 seconds, before slowing down and stopping in a further 5 seconds.

(a) Sketch a velocity-time graph for the car.

(b) Find the total distance travelled by the car.

Solution:

(a)



In the first part of the motion the acceleration of 2 m s^{-2} means the velocity increases by 2 m s^{-1} each second. To reach a velocity of 16 m s^{-1} from rest will take 8 seconds.

(b) distance $= \left(\frac{1}{2} \times 8 \times 16\right) + \left[\left(38 - 8\right) \times 16\right] + \left[\frac{1}{2} \times \left(43 - 38\right) \times 16\right]$

$= 584$ m.