Solutionbank M1

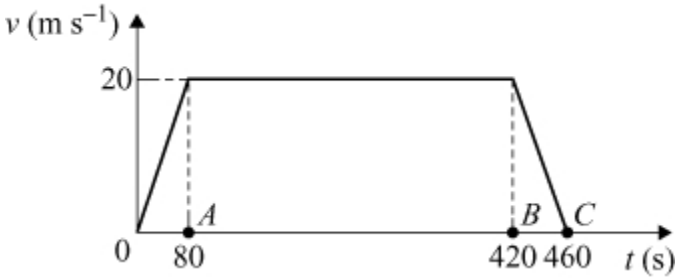
Heinemann Modular Maths for Edexcel AS and A-level

2 Kinematics in one dimension

Exercise A, Question 7

Question:

The diagram shows the velocity-time graph for a train which travels from rest in one station along a straight track to rest at the next station. For each of the time intervals *OA*, *AB* and *BC*, state the value of the train's acceleration.
Calculate the distance between the stations. [A]



Solution:

for *OA*, acceleration $= \frac{20}{80} = 0.25 \text{ m s}^{-2}$

for *AB*, the velocity is constant so acceleration $= 0$

for *BC*, acceleration is $\frac{-20}{(460-420)} = -0.5 \text{ m s}^{-2}$

i.e. a deceleration of 0.5 m s^{-2}.

$$\text{Distance} = \left(\frac{1}{2} \times 80 \times 20\right) + [(420-80) \times 20] + \left[\frac{1}{2} \times (460-420) \times 20\right]$$

$$= 8000 \text{ metres}.$$