Velocity–Time Graphs

Specification: AQA 7357: Q1, Q2 · Edexcel 9MA0: 7.1, 7.2

HOMEWORK Consolidation

1 A velocity–time graph is a straight line from $(0, 2)$ to $(6, 26)$ (v in m s^{-1}, t in s). Find the acceleration.

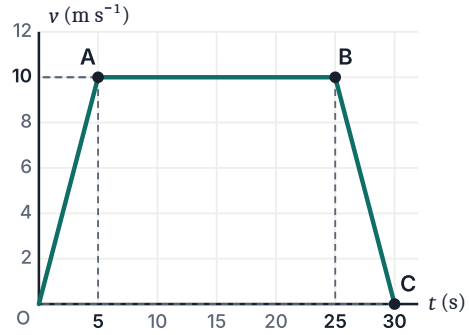
AQA Q2 · Edexcel 7.2

2 A car slows down uniformly from 30 m s^{-1} to 12 m s^{-1} in 6 s. Find its acceleration and its deceleration.

AQA Q2 · Edexcel 7.2

3 The graph shows the velocity of a runner. Find the distance she runs.

AQA Q2 · Edexcel 7.2



4 A bus starts from rest and accelerates uniformly to 12 m s^{-1} in 8 s. It travels at 12 m s^{-1} for 20 s, then decelerates uniformly to rest in 6 s.

(a) Sketch the velocity–time graph.

(b) Find the total distance.

AQA Q2 · Edexcel 7.2

5 A car accelerates uniformly from 36 km h^{-1} to 72 km h^{-1} in 5 s.

(a) Find its acceleration in m s^{-2}.

(b) Find the distance it travels in this time.

AQA P1, Q2 · Edexcel 6.1, 7.2

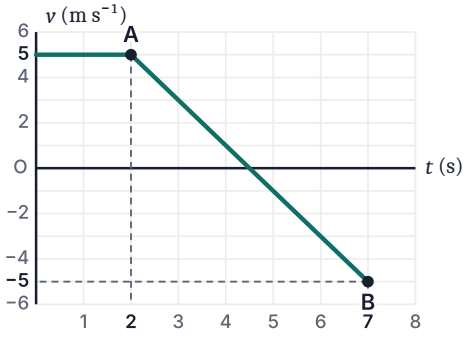
6 The graph shows the velocity of a particle that starts at O.

(a) When does it turn round?

(b) Find its displacement from O at $t = 7$.

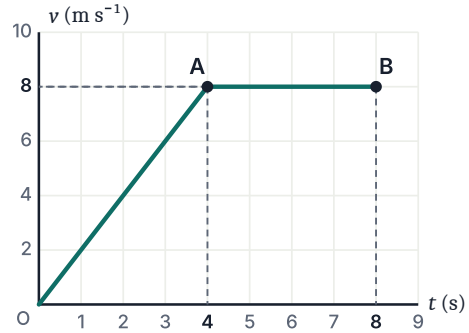
(c) Find the distance it travels.

AQA Q1, Q2 · Edexcel 7.1, 7.2



7 Sketch the displacement–time graph for this velocity–time graph, marking the displacement at A and B. The object starts at O.

AQA Q2 · Edexcel 7.2



8 The velocity of a particle is $v = 3 + 2t$ for $0 \le t \le 5$ (v in m s^{-1}, t in s).

(a) Find its acceleration.

(b) Find the distance it travels in the first 5 s.

AQA Q2 · Edexcel 7.2

9 A velocity–time graph is the horizontal line $v = -4$ for $0 \le t \le 6$. Describe the motion, and find the displacement after 6 s.

AQA Q1, Q2 · Edexcel 7.1, 7.2

10 A particle accelerates uniformly from u m s^{-1} to $3u$ m s^{-1} in 8 s. It travels 96 m. Show that $u = 6$.

AQA Q2 · Edexcel 7.2

11 *AQA-style*. A car moves along a straight road. The graph shows its velocity v m s^{-1} after t seconds.

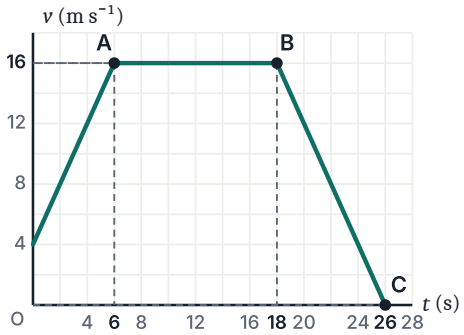
(a) Find the acceleration of the car for the first 6 s. [1 mark]

(b) Find the deceleration of the car on the last stage. [2 marks]

(c) Find the total distance travelled. [3 marks]

(d) Find the average speed of the car. [1 mark]

AQA Q2 · Edexcel 7.2 · AQA-style



12 *Edexcel-style*. A particle P moves along a straight line. At time $t = 0$ it passes through O with velocity 6 m s^{-1}. It accelerates uniformly at 0.5 m s^{-2} for 4 s, then decelerates uniformly at 2 m s^{-2} until its velocity is 4 m s^{-1} in the opposite direction.

(a) Sketch a velocity–time graph for the motion of P. (2)

(b) Find the value of t when P is instantaneously at rest. (1)

(c) Find the greatest distance of P from O in the direction of its initial motion. (2)

(d) Find the displacement of P from O at the end of the motion. (1)

AQA Q2 · Edexcel 7.2 · Edexcel-style