Displacement–Time Graphs

Specification: AQA 7357: P1, Q1, Q2 · Edexcel 9MA0: 6.1, 7.1, 7.2

HOMEWORK Consolidation

1 A displacement–time graph is a straight line from $(0, 0)$ to $(12, 42)$ (s in m, t in s). Find the velocity.

AQA Q2 · Edexcel 7.2

2 A displacement–time graph is a straight line from $(2, 30)$ to $(8, 6)$ (s in m, t in s). Find the velocity and the speed.

AQA Q2 · Edexcel 7.2

3 (a) Convert 90 km h^{-1} into m s^{-1}.
(b) Convert 8 m s^{-1} into km h^{-1}.

AQA P1 · Edexcel 6.1

4 A train travels 45 km in 30 minutes, then a further 15 km in 10 minutes in the same direction. Find its average speed in km h^{-1}.

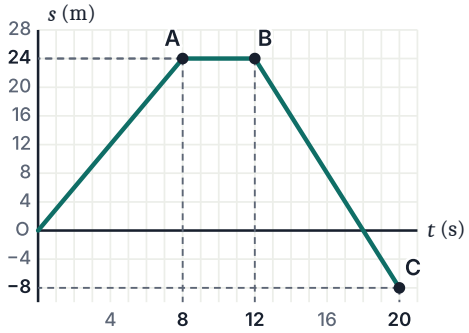
AQA Q1, Q2 · Edexcel 7.1, 7.2

5 A swimmer swims 50 m along a straight lane in 40 s and swims back in 60 s.
(a) Find her average velocity.
(b) Find her average speed.

AQA Q1, Q2 · Edexcel 7.1, 7.2

6 The graph shows the displacement of a model car from a post.
(a) Find the velocity on each stage.
(b) Find the average velocity.
(c) Find the average speed.

AQA Q1, Q2 · Edexcel 7.1, 7.2



7 A drone rises vertically 30 m in 10 s, hovers for 5 s, then comes down to the ground at 2 m s^{-1}.
(a) Sketch the displacement–time graph.
(b) Find the average speed for the whole flight.

AQA Q2 · Edexcel 7.2

8 A car drives 9 km along a straight road at 54 km h^{-1}, stops for 4 minutes, then returns at V km h^{-1}. The whole trip takes 30 minutes. Find V.

AQA Q1, Q2 · Edexcel 7.1, 7.2

9 The displacement–time graph of a particle is a curve that gets steeper as time increases. What does this tell you about the particle?

AQA Q1 · Edexcel 7.1

10 A boat travels d km upstream at 8 km h^{-1} and returns the same distance at 12 km h^{-1}. Show that its average speed for the whole trip is 9.6 km h^{-1}.

AQA Q1, Q2 · Edexcel 7.1, 7.2

11 *AQA-style*. A cyclist moves along a straight path. The graph shows her displacement s metres from a gate after t seconds.

(a) Find her velocity for the first 20 s. [1 mark]

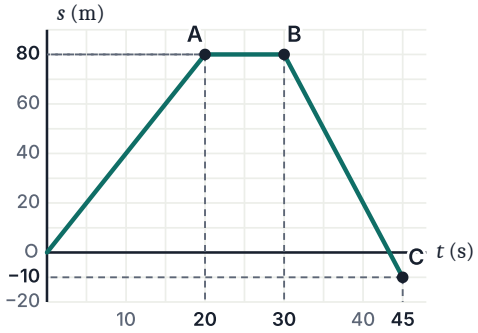
(b) Find her velocity on the last stage. [2 marks]

(c) Find the total distance she travels. [1 mark]

(d) Find her average speed. [2 marks]

(e) Find her average velocity. [1 mark]

AQA Q1, Q2 · Edexcel 7.1, 7.2 · AQA-style



12 *Edexcel-style*. A train moves along a straight track from station P. It travels 2.4 km in 3 minutes at constant speed, stops at station Q for 2 minutes, then travels a further 3.6 km in 4 minutes at constant speed to station R.

(a) Sketch a displacement–time graph for the journey from P to R. (2)

(b) Find the speed of the train between Q and R, in m s^{-1}. (2)

(c) Find the average speed for the journey from P to R, in km h^{-1}. (2)

AQA Q1, Q2 · Edexcel 7.1, 7.2 · Edexcel-style