

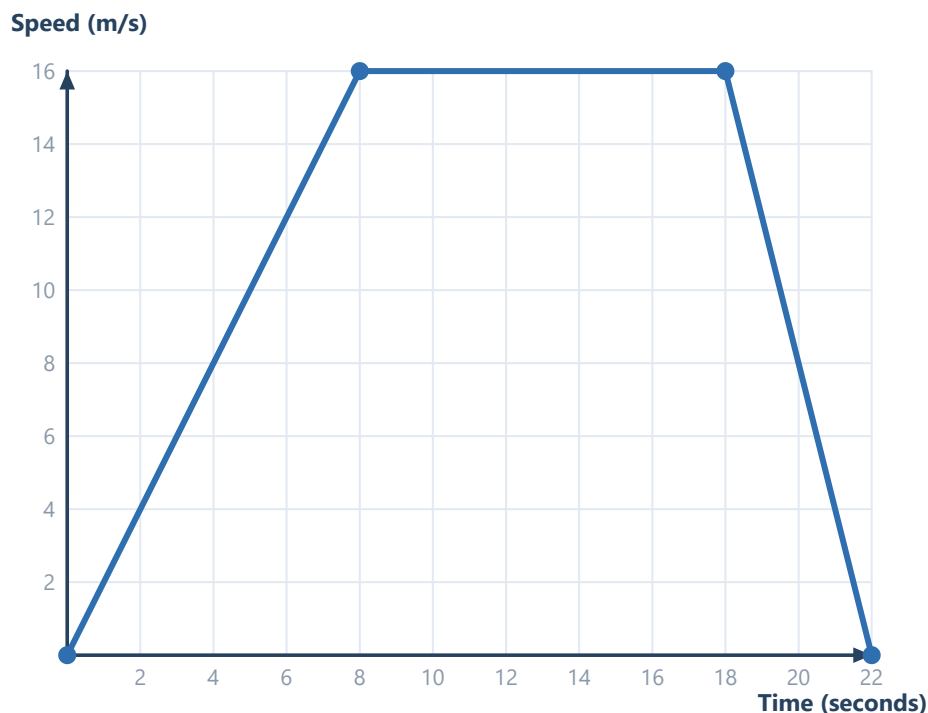
GCSE Maths: Speed-time graphs (Higher): answers

GCSE Maths - Quadratic and Other Graphs - Higher - Lesson 13.8

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch13-quadratic-other-graphs/higher/speed-time-graphs/

Exercise 13H Speed-time graphs Non-calculator

- 1 The graph shows the speed of a car. Use it to find (a) the speed after 4 seconds, (b) how long the car travelled at a constant speed, (c) the acceleration in the first 8 seconds, (d) the deceleration in the last 4 seconds.



- (a) speed after 4 seconds

Answer: 8 m/s

- (b) time at constant speed

Answer: 10 seconds

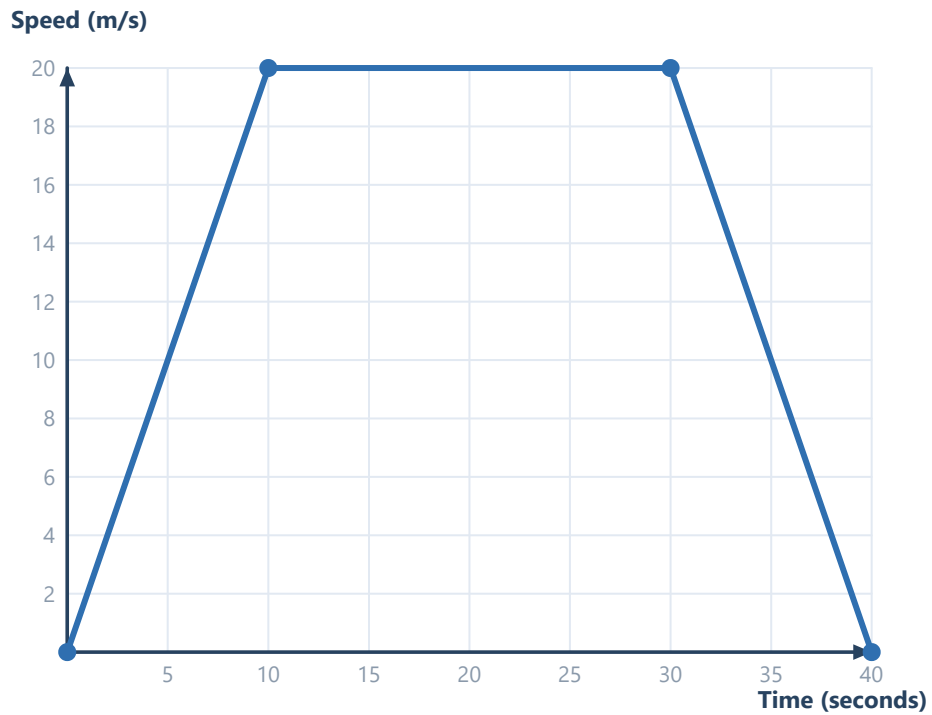
- (c) acceleration in the first 8 seconds

Answer: 2 m/s^2

- (d) deceleration in the last 4 seconds

Answer: -4 m/s^2 (deceleration of 4 m/s^2)

- 2 A train's journey is shown. Find (a) its acceleration in the first 10 seconds, (b) its speed while moving steadily, (c) how long it takes to stop at the end, (d) its deceleration at the end.



(a) acceleration

Answer: 2 m/s^2

(b) steady speed

Answer: 20 m/s

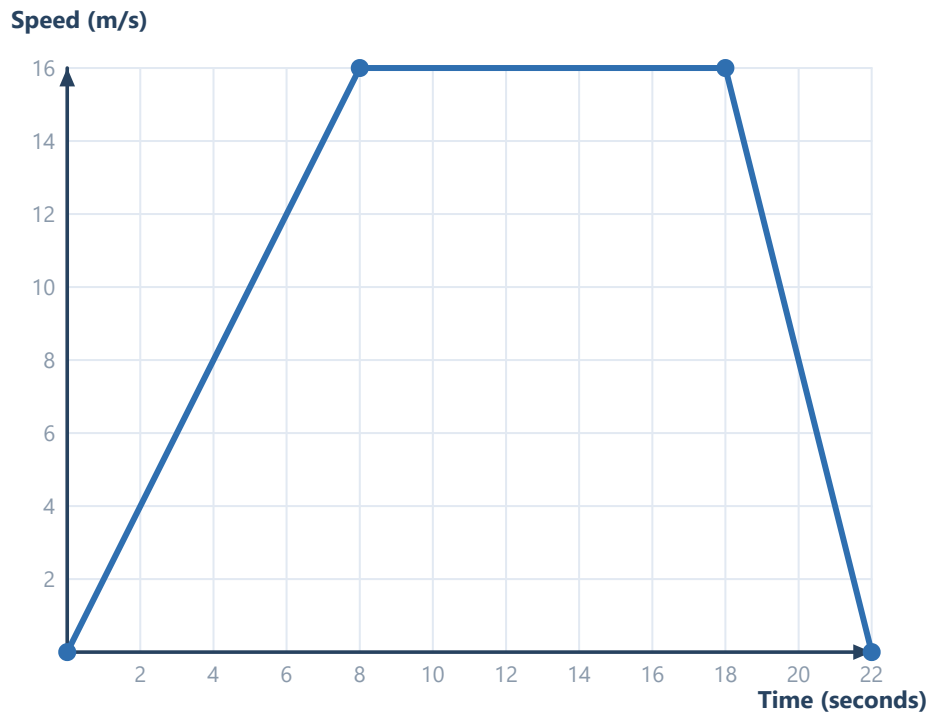
(c) time to stop

Answer: 10 seconds

(d) deceleration

Answer: -2 m/s^2 (deceleration of 2 m/s^2)

- 3 Use the car graph to work out the distance travelled (a) in the first 8 seconds, (b) in the 10 seconds at constant speed, (c) in the whole 22 seconds.



(a) first 8 seconds

Answer: 64 m

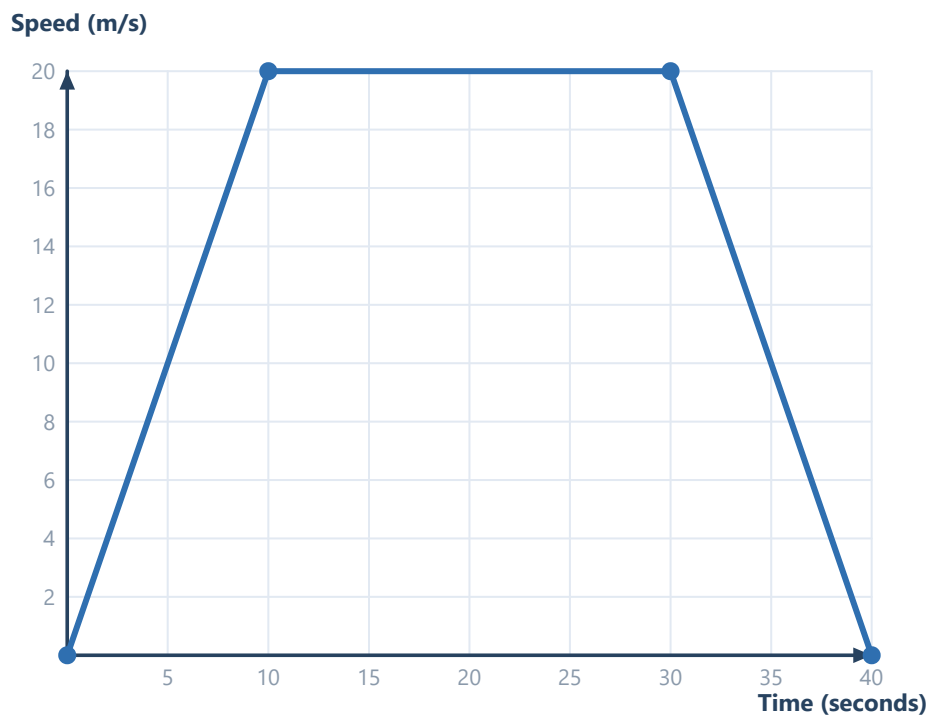
(b) the 10 seconds at constant speed

Answer: 160 m

(c) the whole 22 seconds

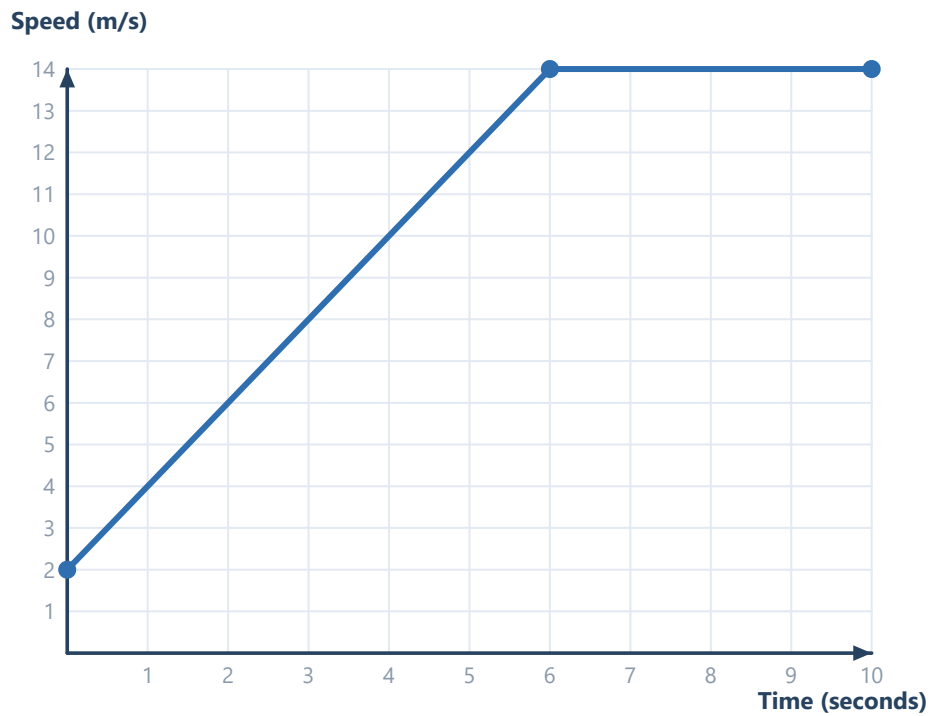
Answer: 256 m

4 Work out the total distance travelled by the train in the graph (40 seconds).



Answer: 600 m

- 5 A cyclist's speed is shown. Find (a) the acceleration in the first 6 seconds, (b) the distance travelled in the 10 seconds.



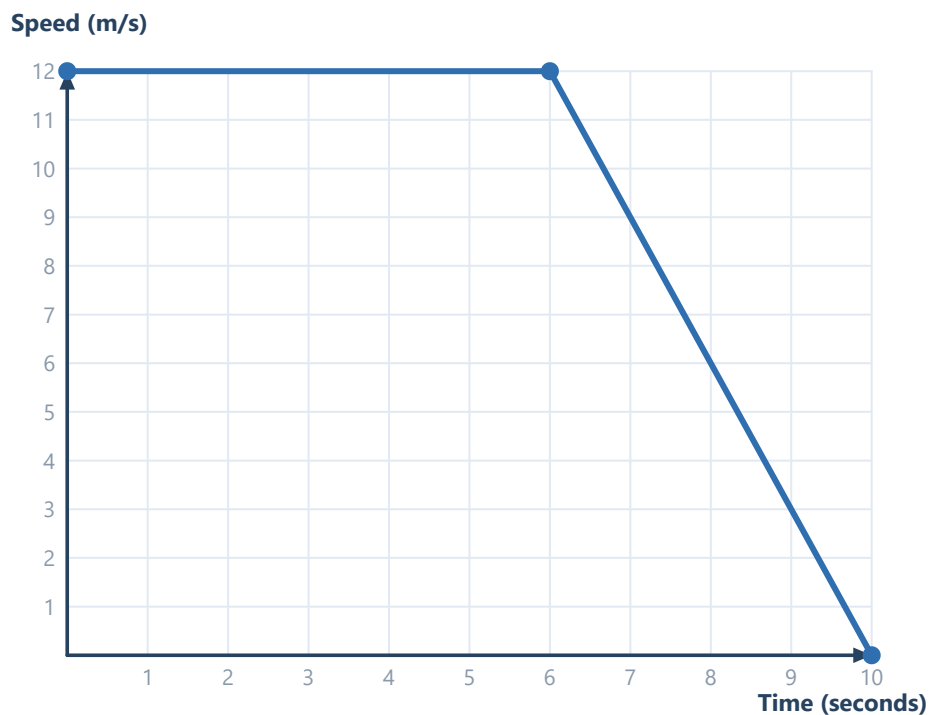
- (a) acceleration

Answer: 2 m/s²

- (b) distance in 10 seconds

Answer: 104 m

- 6 A lorry travels at a steady speed, then brakes to a stop. Use the graph to find (a) the speed of the lorry before braking, (b) the deceleration, (c) the total distance travelled in the 10 seconds.



- (a) speed before braking

Answer: 12 m/s

(b) deceleration

Answer: -3 m/s^2 (deceleration of 3 m/s^2)

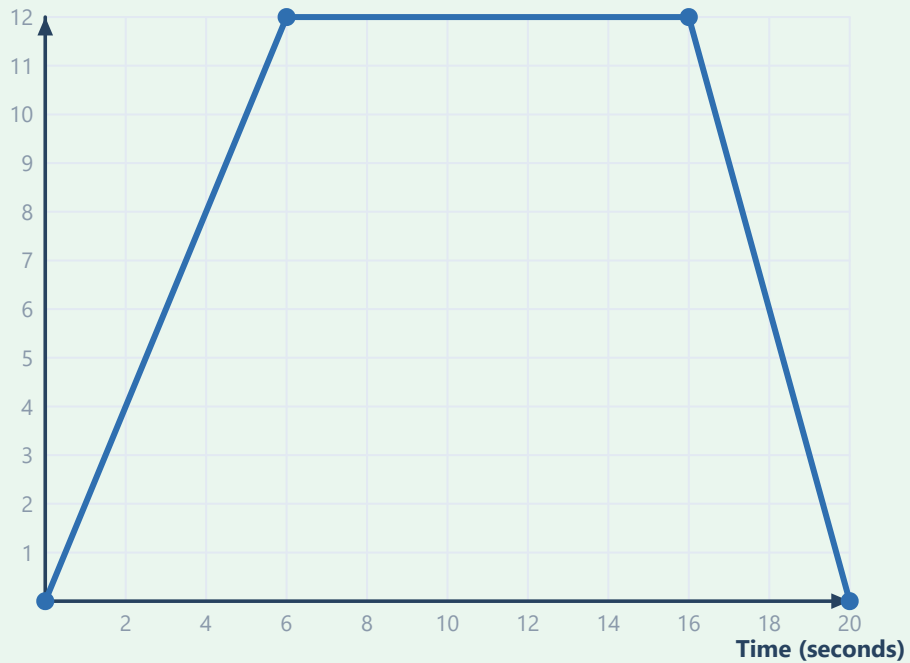
(c) total distance

Answer: 96 m

- 7 A car starts from rest and speeds up to 12 m/s in 6 seconds. It then travels at 12 m/s for 10 seconds, then slows down to a stop in 4 seconds. Draw a speed-time graph for the car, then work out its total distance.

Answer: Points: (0, 0), (6, 12), (16, 12), (20, 0).

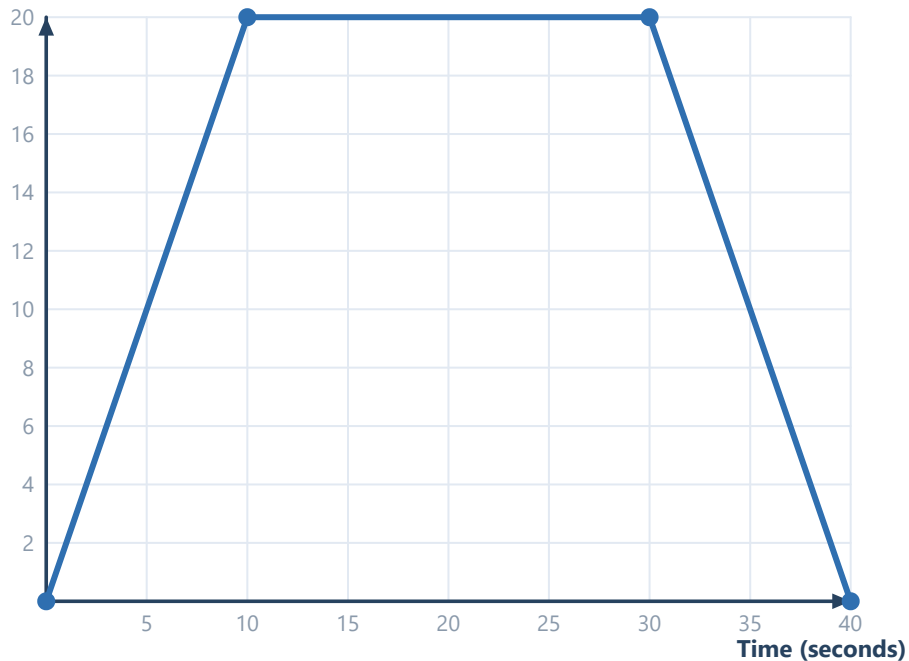
Speed (m/s)



Total distance 180 m

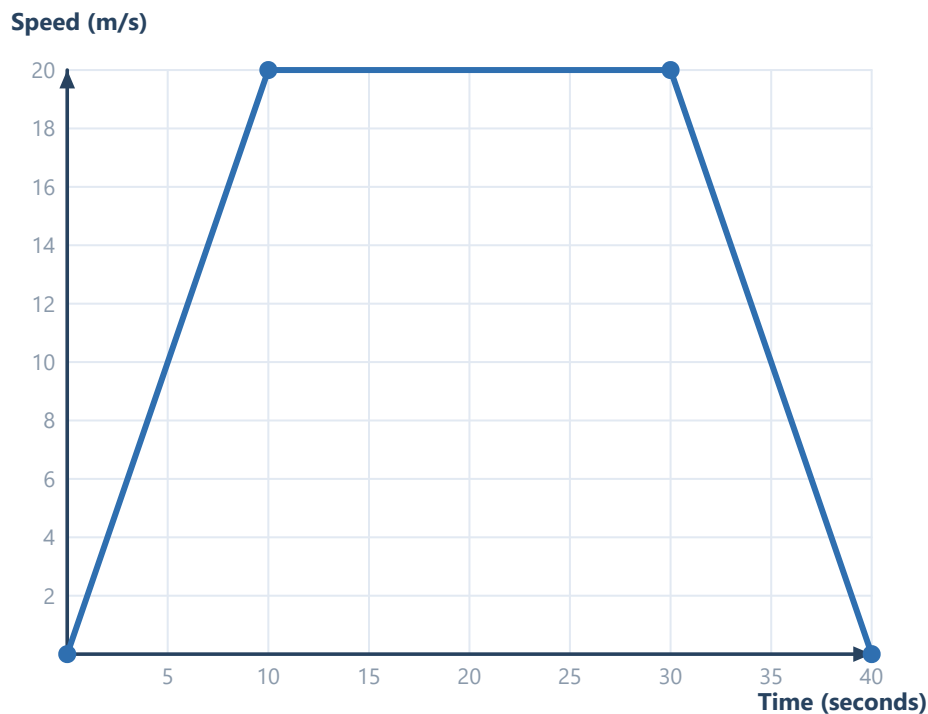
- 8 Use the train graph to find the train's average speed over the 40 seconds.

Speed (m/s)



Answer: 15 m/s

- 9 The train's speed increases steadily from 0 to 20 m/s in 10 seconds. How far has it travelled when its speed first reaches 15 m/s?



Answer: 56.25 m

- 10 Layla says: "The line on a speed-time graph slopes down, so the car is going backwards." Explain her mistake.

Answer: The car is slowing down, not reversing

- 11 Complete the table to compare what a flat line and a sloping-up line mean on each type of graph.

- (a) A flat line on a distance-time graph

Answer: Stopped

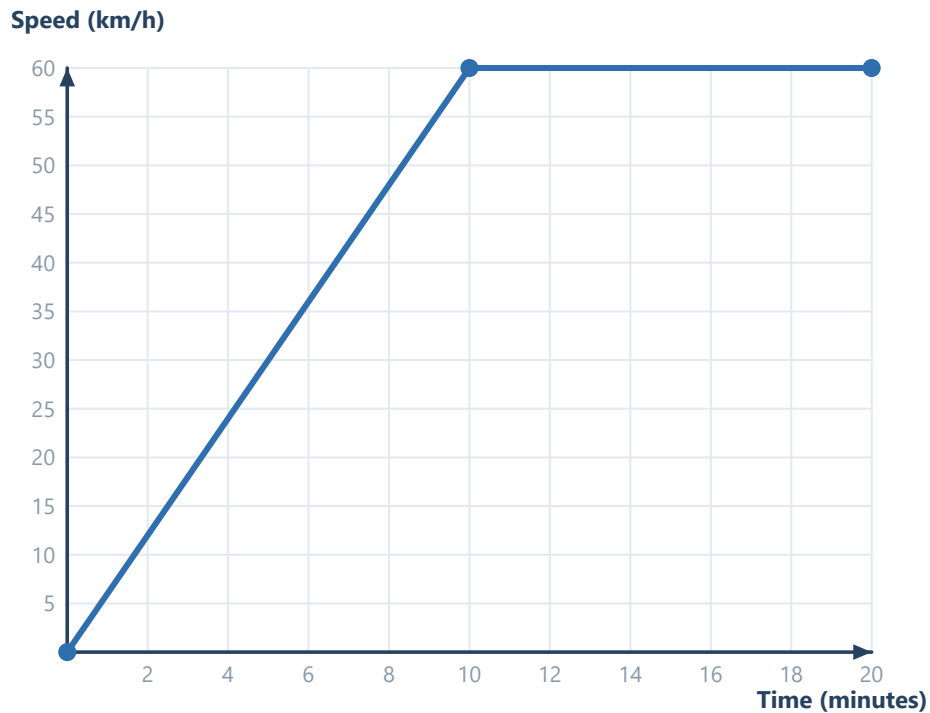
- (b) A flat line on a speed-time graph

Answer: Constant speed

- (c) A sloping-up line on a speed-time graph

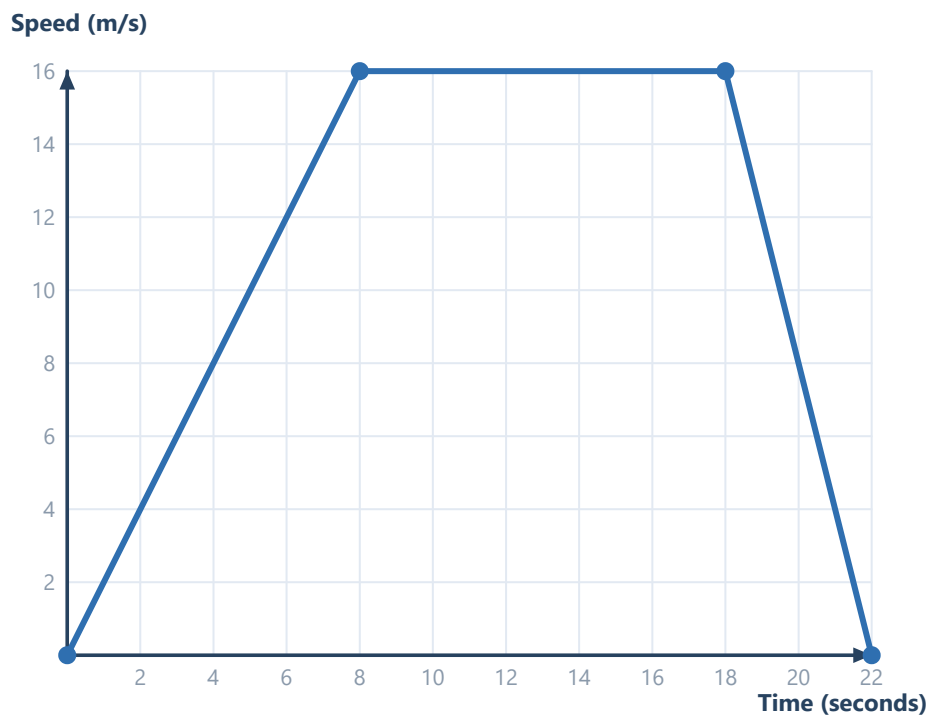
Answer: Accelerating

- 12 A train's speed is in km/h and time is in minutes: it accelerates steadily from 0 to 60 km/h in 10 minutes, then travels at 60 km/h for 10 minutes. Work out the distance travelled in km.



Answer: 15 km

- 13** Use the car graph to find the times when the car's speed is 10 m/s.



Answer: 5 and 19.5 seconds

- 14** Car A accelerates at 2 m/s^2 from rest for 10 seconds and then travels at constant speed. Car B accelerates steadily from rest at 1 m/s^2 for 20 seconds. Both start together. Draw both on a speed-time graph. Which car has travelled further after 20 seconds, and by how much?

Answer: Car A is further, by 100 m (300 m compared with 200 m).

