

Reading journeys from motion graphs

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test covers reading and interpreting distance-time and velocity-time graphs. Show all working, include units and use gradients and areas correctly. Calculators and rulers are allowed.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** IGCSE 1.2

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

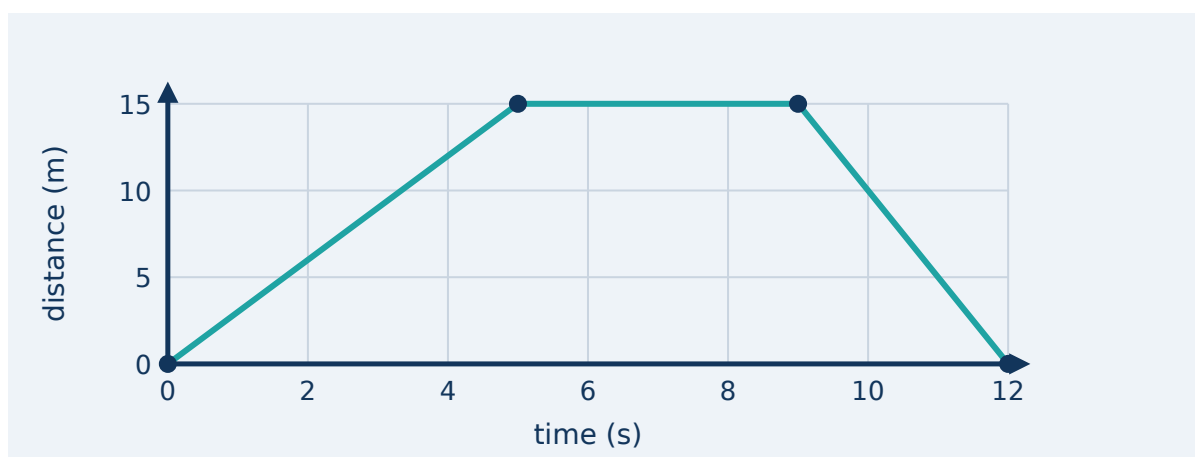
Question 1 Gradient meanings (2 marks)

- State what the gradient of a distance-time graph represents. (1 mark)
- State what a horizontal line on a distance-time graph means. (1 mark)

Question 2 A short trip (3 marks)

The graph shows a trip along a path.

- Calculate the speed in the first 5 s. (1 mark)
- Describe the motion from 5 s to 9 s. (1 mark)
- Calculate the speed from 9 s to 12 s. (1 mark)



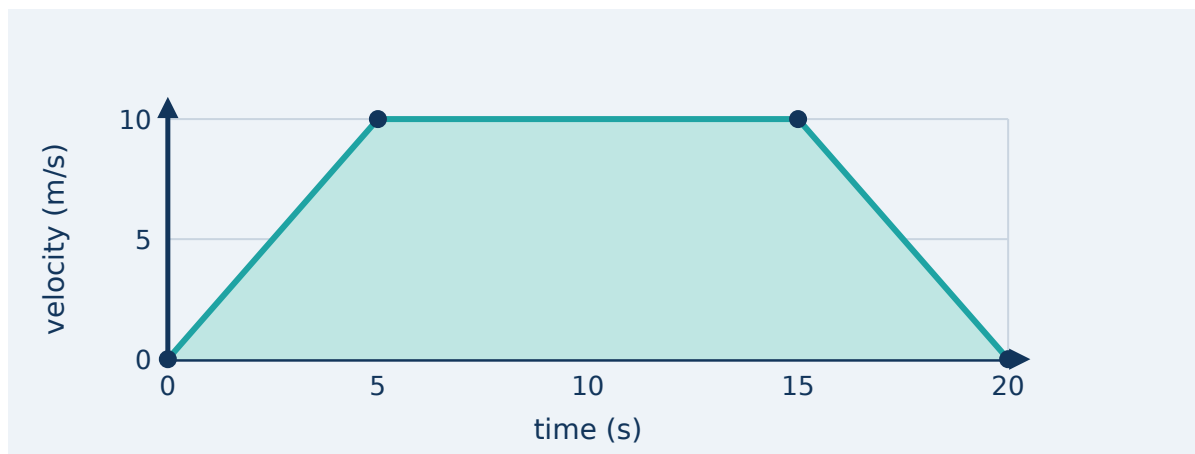
Distance against time for a short trip.

Question 3 A velocity graph (3 marks)

The graph shows the motion of a handcart.

- Calculate the acceleration in the first 5 s. (1 mark)

b. Calculate the total distance travelled. (2 marks)



Velocity against time for the handcart.

Question 4 Units of area (2 marks)

Explain why the area under a velocity-time graph gives a distance, by referring to the units of the two axes. (2 marks)

Question 5 Speeding up then cruising (3 marks)

A tricycle accelerates uniformly from rest at 3.0 m/s^2 for 4.0 s and then travels at constant velocity for 5.0 s . Calculate the final speed of the acceleration, the distance in the first 4.0 s and the total distance. (3 marks)

Question 6 Compare two runners (2 marks)

Runner P's distance-time graph is a straight line through $(0 \text{ s}, 0 \text{ m})$ and $(10 \text{ s}, 60 \text{ m})$. Runner Q's passes through $(0 \text{ s}, 0 \text{ m})$ and $(10 \text{ s}, 45 \text{ m})$. State which runner is faster and justify your answer with calculations. (2 marks)

Question 7 Negative velocity (3 marks)

A glider's velocity falls steadily from $+6.0 \text{ m/s}$ at 0 s to -6.0 m/s at 6.0 s .

- Calculate its acceleration. (1 mark)
- State the time at which it is momentarily at rest. (1 mark)
- Explain what happens to its direction of motion at that time. (1 mark)

Question 8 Average speed from points (2 marks)

A cyclist is at 0 m at 0 s , 80 m at 20 s and 180 m at 50 s . Calculate her average speed for the whole 50 s . (2 marks)