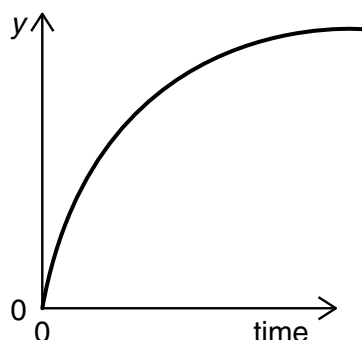
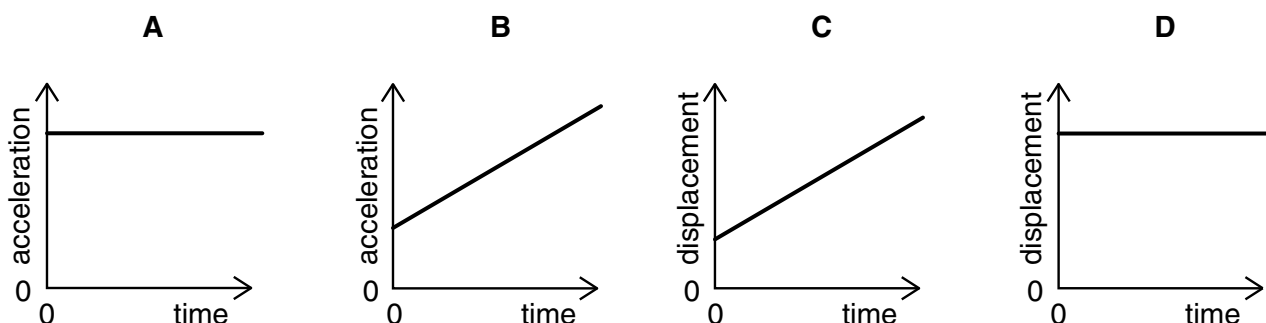


- 1 The graph relates to the motion of a falling body.



Which is a correct description of the graph?

- A** y is distance and air resistance is negligible
B y is distance and air resistance is not negligible
C y is speed and air resistance is negligible
D y is speed and air resistance is not negligible
- 2 Which graph represents the motion of a car that is travelling along a straight road with a uniformly increasing speed?



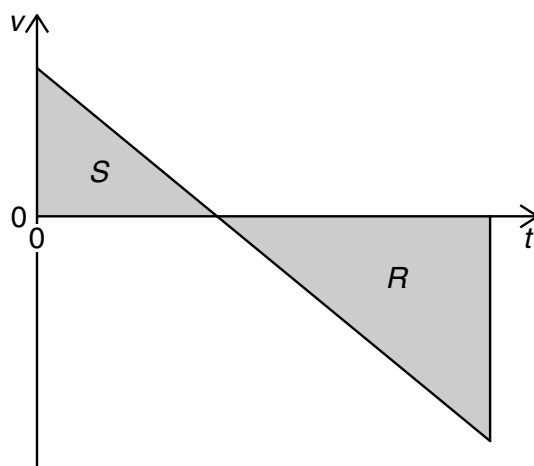
- 3 A boy throws a ball vertically upwards. It rises to a maximum height, where it is momentarily at rest, and falls back to his hands.

Which of the following gives the acceleration of the ball at various stages in its motion? Take vertically upwards as positive. Neglect air resistance.

	rising	at maximum height	falling
A	-9.81 ms^{-2}	0	$+9.81 \text{ ms}^{-2}$
B	-9.81 ms^{-2}	-9.81 ms^{-2}	-9.81 ms^{-2}
C	$+9.81 \text{ ms}^{-2}$	$+9.81 \text{ ms}^{-2}$	$+9.81 \text{ ms}^{-2}$
D	$+9.81 \text{ ms}^{-2}$	0	-9.81 ms^{-2}

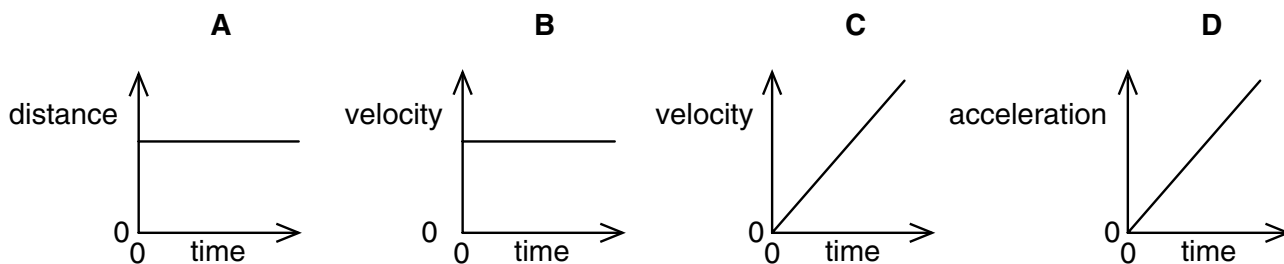
- 4 Which feature of a graph allows acceleration to be determined?
- A** the area under a displacement-time graph
B the area under a velocity-time graph
C the slope of a displacement-time graph
D the slope of a velocity-time graph
- 5 A stone is thrown upwards from the top of a cliff. After reaching its maximum height, it falls past the cliff-top and into the sea.

The graph shows how the vertical velocity v of the stone varies with time t after being thrown upwards. R and S are the magnitudes of the areas of the two triangles.



What is the height of the cliff-top above the sea?

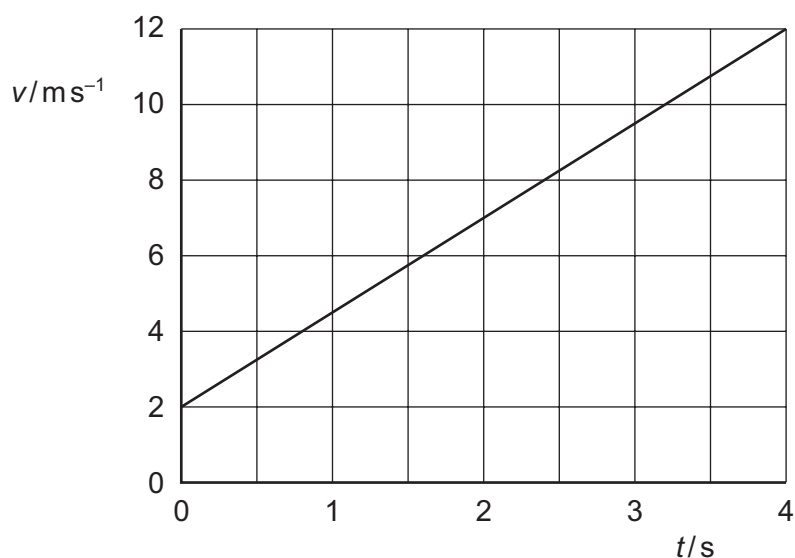
- A** R **B** S **C** $R + S$ **D** $R - S$
- 6 A particle is moving in a straight line with uniform acceleration.
- Which graph represents the motion of the particle?



7 What gives the value of a body's acceleration?

- A the area under its displacement-time graph
- B the area under its velocity-time graph
- C the gradient of its displacement-time graph
- D the gradient of its velocity-time graph

8 The diagram shows a velocity-time graph for a car.



What is the distance travelled between time $t = 0$ and $t = 4$ s?

- A 2.5 m
- B 3.0 m
- C 20 m
- D 28 m

9 A mass accelerates uniformly when the resultant force acting on it

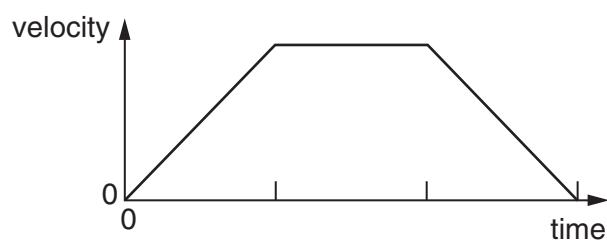
- A is zero.
- B is constant but not zero.
- C increases uniformly with respect to time.
- D is proportional to the displacement from a fixed point.

10 A stone is dropped from the top of a tower of height 40 m. The stone falls from rest and air resistance is negligible.

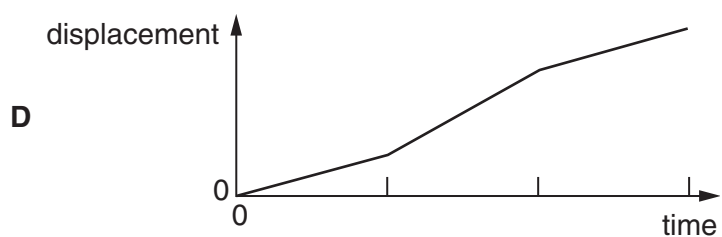
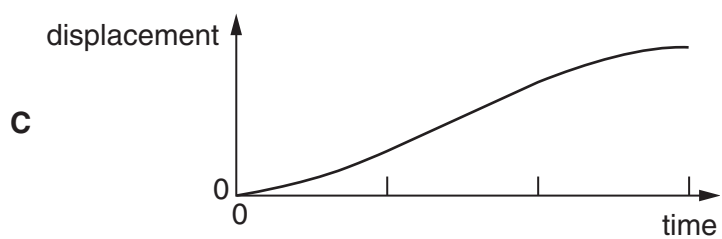
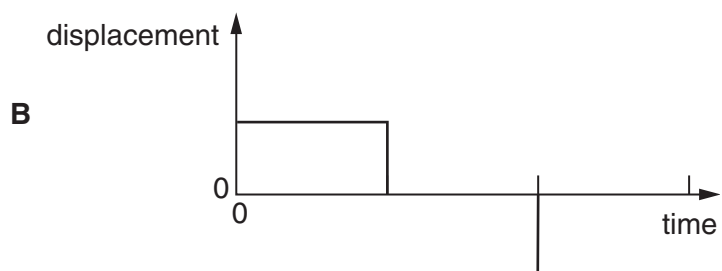
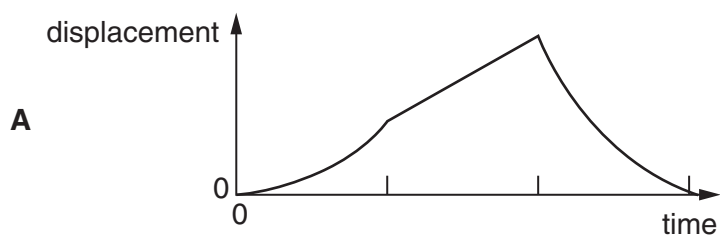
What time is taken for the stone to fall the last 10 m to the ground?

- A 0.38 s
- B 1.4 s
- C 2.5 s
- D 2.9 s

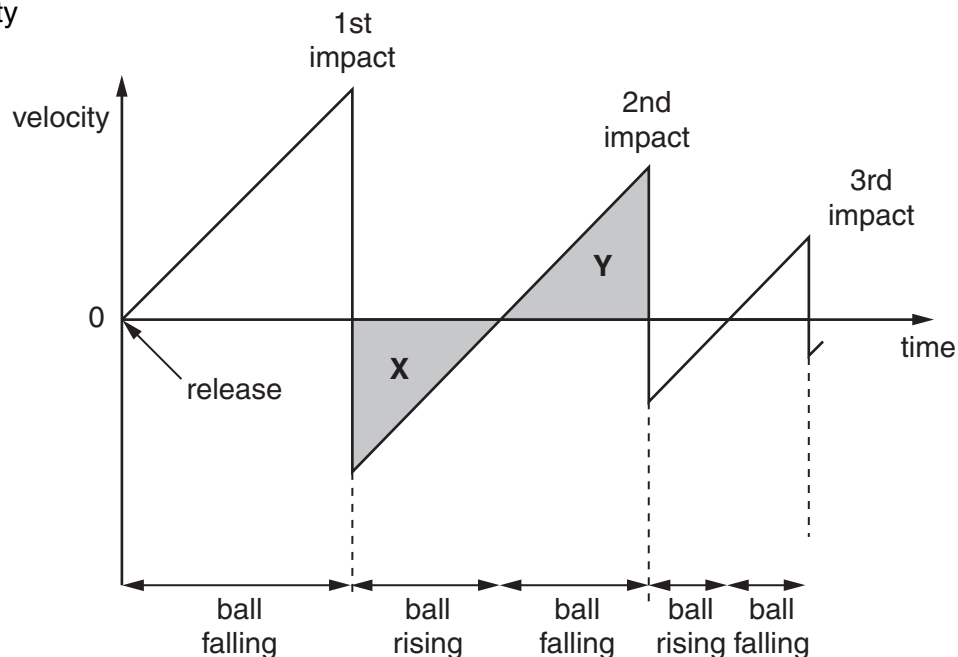
11 The graph of velocity against time for an object moving in a straight line is shown.



Which of the following is the corresponding graph of displacement against time?



- 12 A ball is released from rest above a horizontal surface. The graph shows the variation with time of its velocity

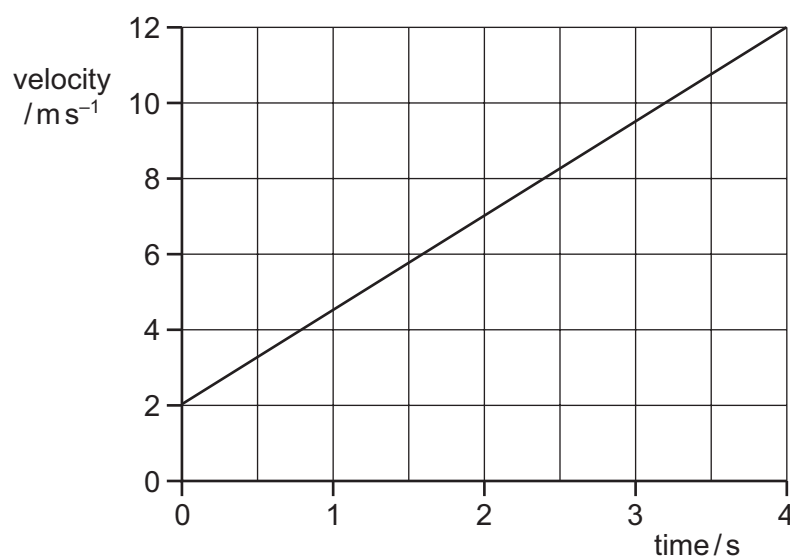


Areas **X** and **Y** are equal.

This is because

- A** the ball's acceleration is the same during its upward and downward motion.
- B** the speed at which the ball leaves the surface after an impact is equal to the speed at which it returns to the surface for the next impact.
- C** for one impact, the speed at which the ball hits the surface equals the speed at which it leaves the surface.
- D** the ball rises and falls through the same distance between impacts.

- 13 The diagram shows a velocity-time graph for a car.

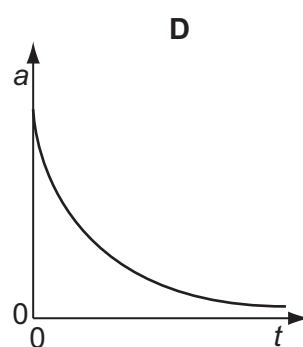
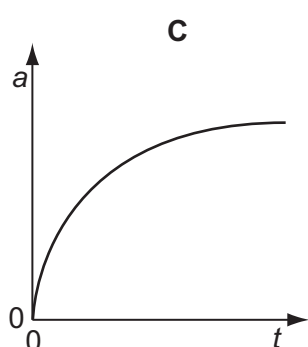
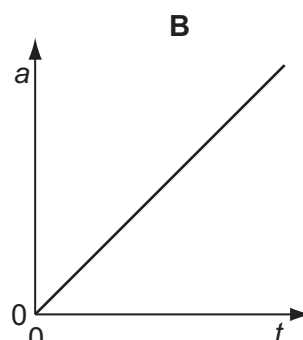
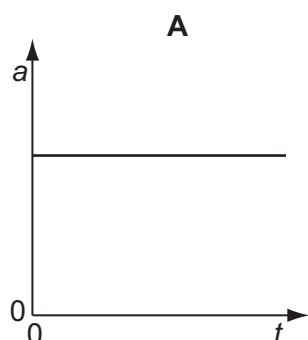


What is the distance travelled during the first 4.0 s?

- A** 2.5 m
- B** 3.0 m
- C** 20 m
- D** 28 m

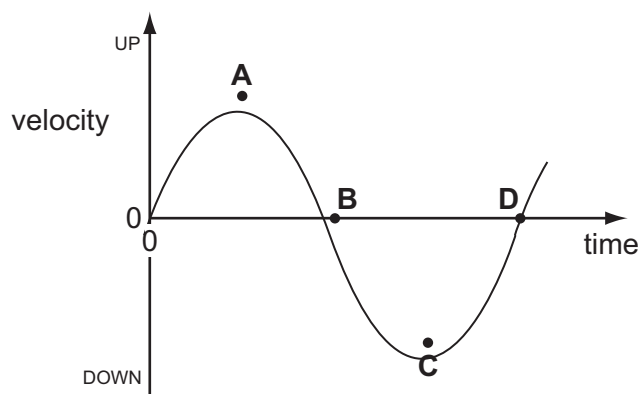
- 14 A tennis ball is released from rest at the top of a tall building.

Which graph best represents the variation with time t of the acceleration a of the ball as it falls, assuming that the effects of air resistance are appreciable?



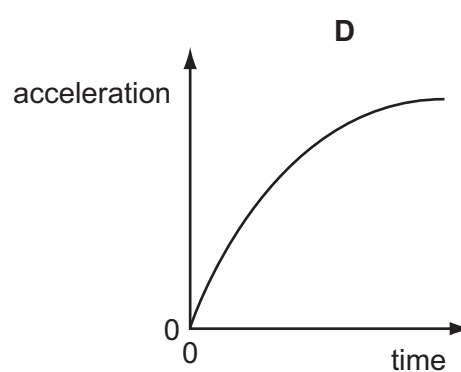
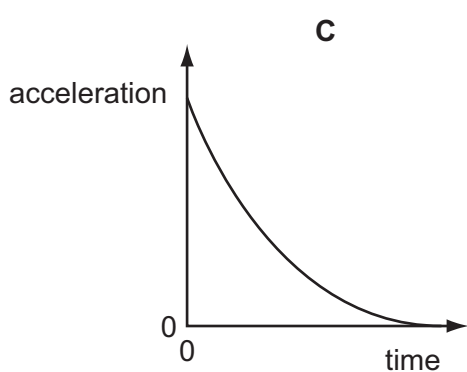
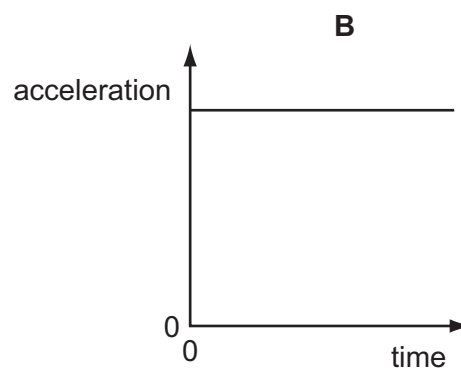
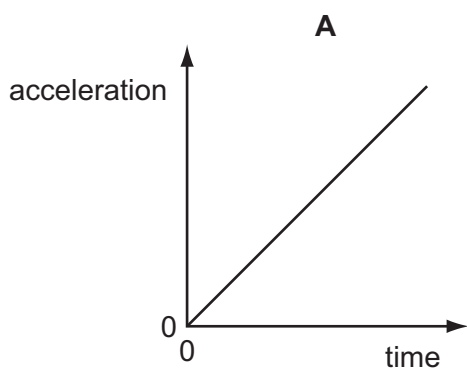
- 15 The diagram shows a velocity-time graph for a mass moving up and down on the end of a spring.

Which point represents the velocity of the mass when at the lowest point of its motion?

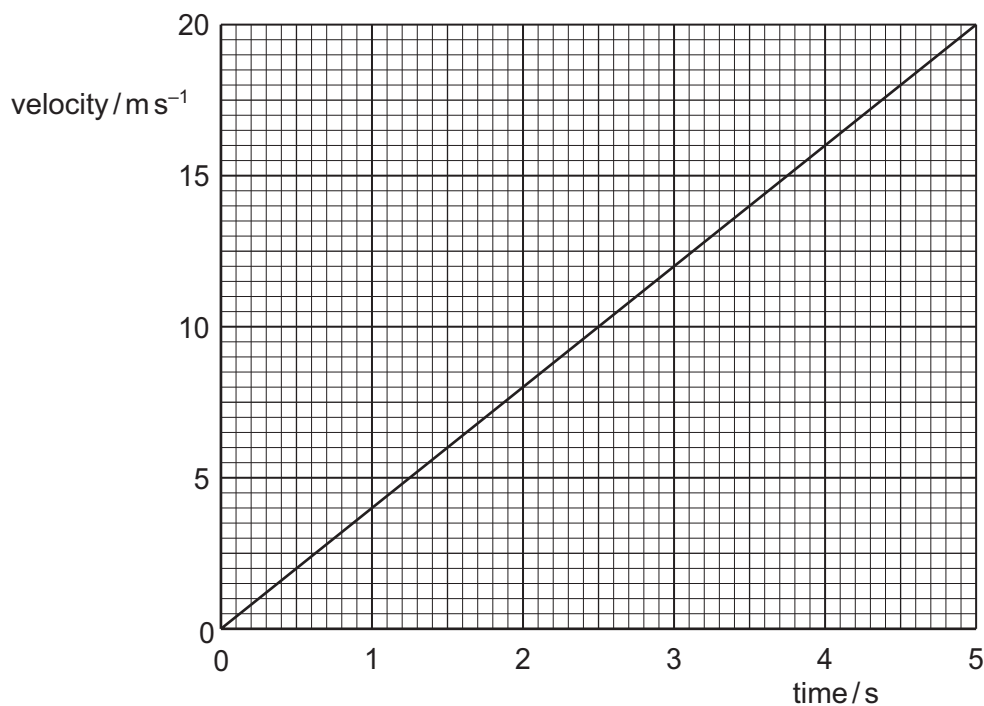


16 A football is dropped from the top of a tall building.

Which acceleration-time graph best represents the motion of the football through the air?



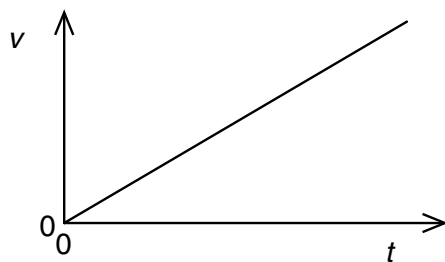
17 The velocity of an object during the first five seconds of its motion is shown on the graph.



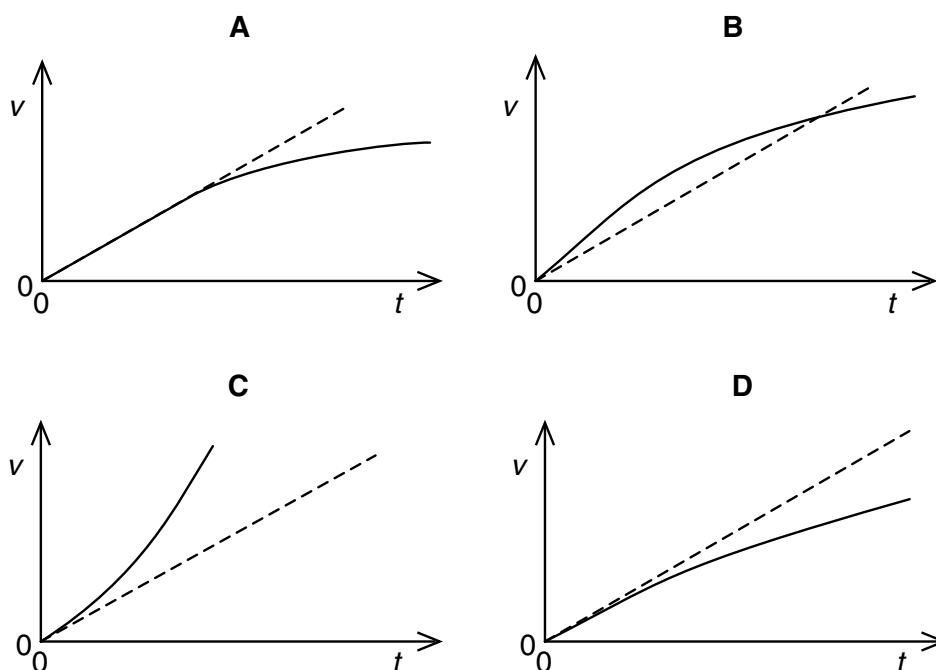
What is the distance travelled by the object in this time?

- A** 4 m **B** 20 m **C** 50 m **D** 100 m

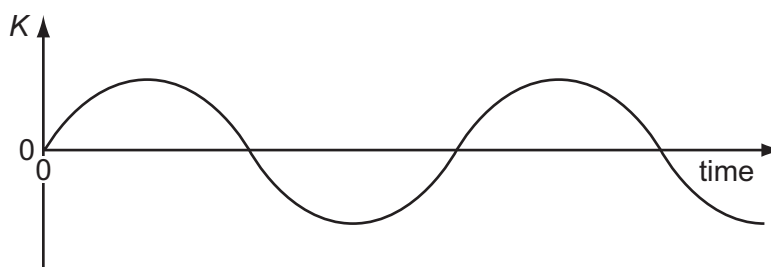
- 18 A body falls from rest in a vacuum near the Earth's surface. The variation with time t of its speed v is shown below.



Which graph shows the variation with time t of the speed v of the same ball falling in air at the same place on Earth?



- 19 A particle moves along a straight line. A particular property K of the particle's motion is plotted against time.

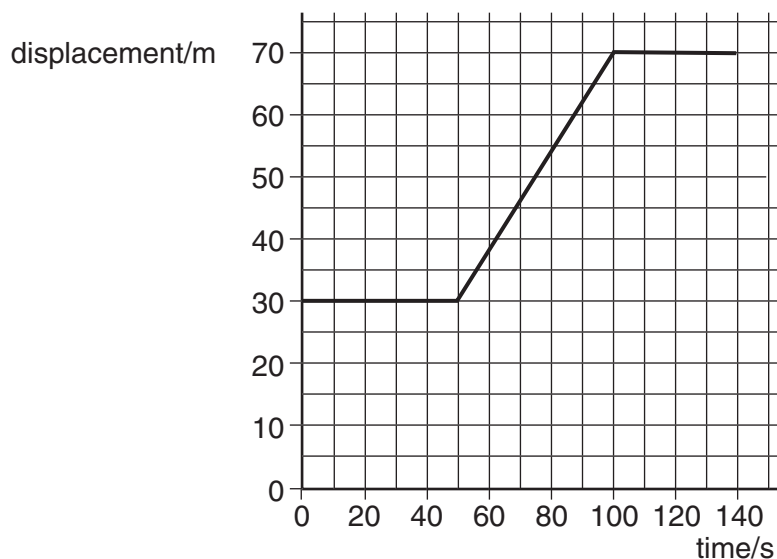


At any time, the slope of the graph is the acceleration of the particle.

What is the property K ?

- A the displacement of the particle
- B the distance travelled by the particle
- C the speed of the particle
- D the velocity of the particle

- 20 A car at rest in a traffic queue moves forward in a straight line and then comes to rest again. The graph shows the variation with time of its displacement.

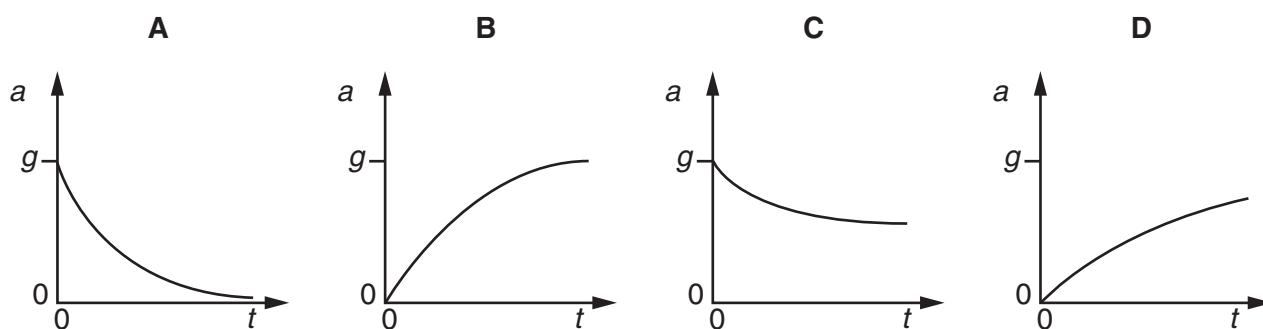


What is its speed while it is moving?

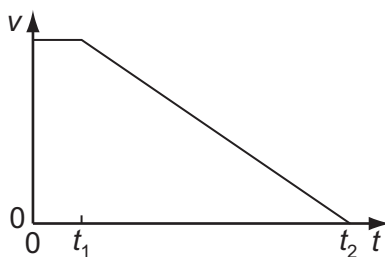
- A** 0.70 m s^{-1} **B** 0.80 m s^{-1} **C** 1.25 m s^{-1} **D** 1.40 m s^{-1}
- 21 An object is dropped from a great height and falls through air of uniform density.

The acceleration of free fall is g .

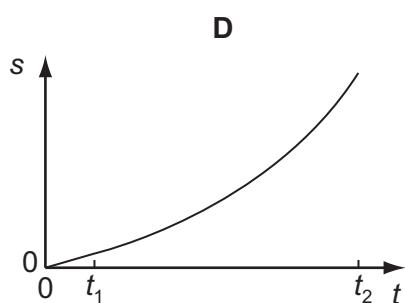
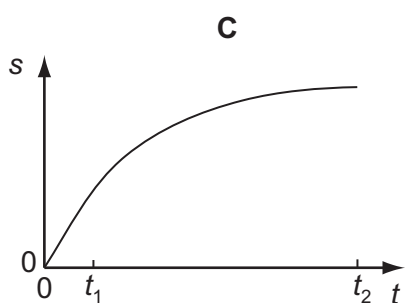
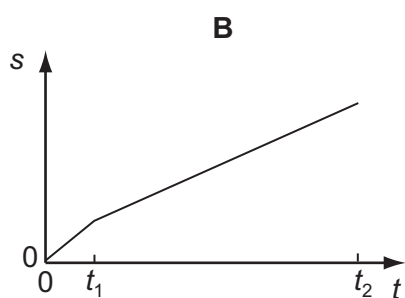
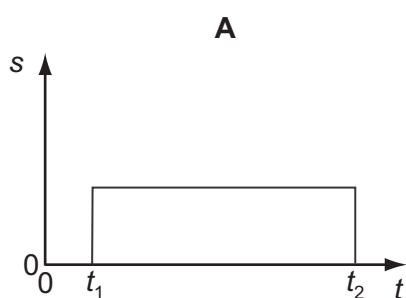
Which graph could show the variation with time t of the acceleration a of the object?



- 22 When a car driver sees a hazard ahead, she applies the brakes as soon as she can and brings the car to rest. The graph shows how the speed v of the car varies with time t after the hazard is seen.



Which graph represents the variation with time t of the distance s travelled by the car after the hazard has been seen?

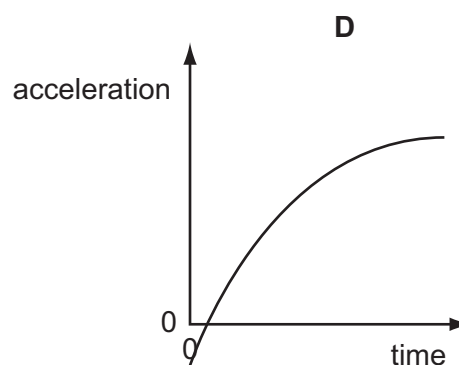
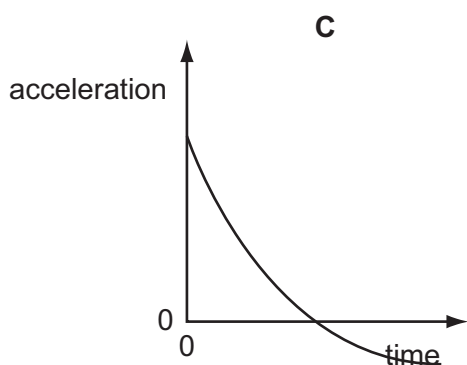
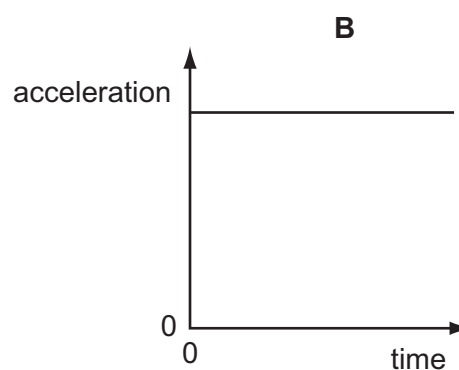
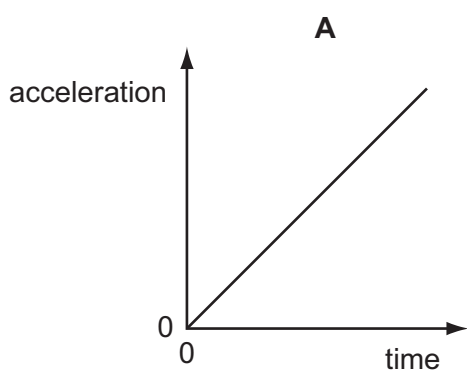


- 23** A force F is applied to a freely moving object. At one instant of time, the object has velocity v and acceleration a .

Which quantities **must** be in the same direction?

- A** a and v only
B a and F only
C v and F only
D v , F and a
- 24** A football is dropped from the top of a tall building.

Which acceleration-time graph best represents the motion of the football through the air?

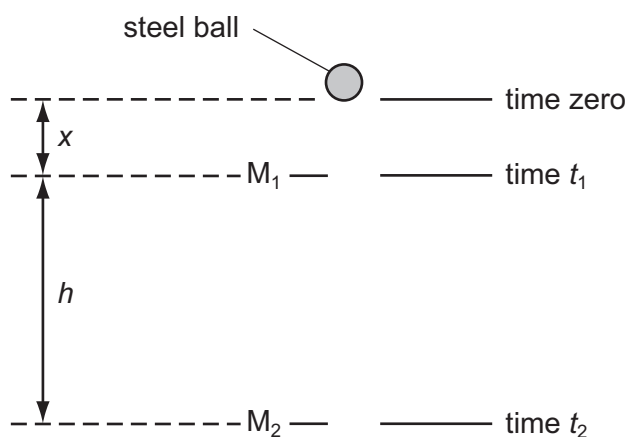


- 25** A constant mass undergoes uniform acceleration.

Which of the following is a correct statement about the resultant force acting on the mass?

- A** It increases uniformly with respect to time.
B It is constant but not zero.
C It is proportional to the displacement from a fixed point.
D It is proportional to the velocity.

- 26 Two markers M_1 and M_2 are set up a vertical distance h apart.

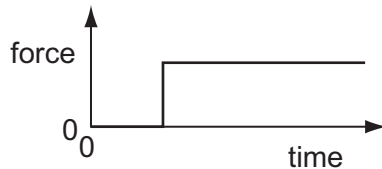


A steel ball is released at time zero from a point a distance x above M_1 . The ball reaches M_1 at time t_1 and reaches M_2 at time t_2 . The acceleration of the ball is constant.

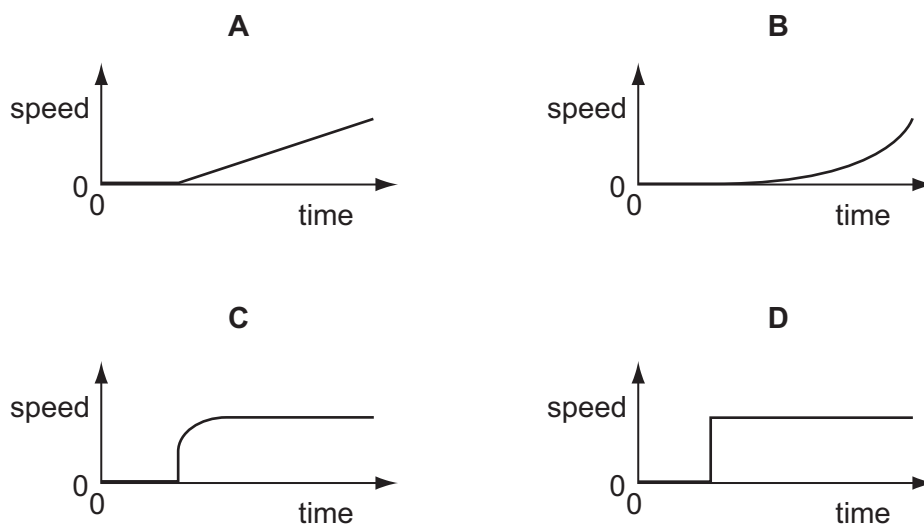
Which expression gives the acceleration of the ball?

- A $\frac{2h}{t_2^2}$ B $\frac{2h}{(t_2 + t_1)}$ C $\frac{2h}{(t_2 - t_1)^2}$ D $\frac{2h}{(t_2^2 - t_1^2)}$

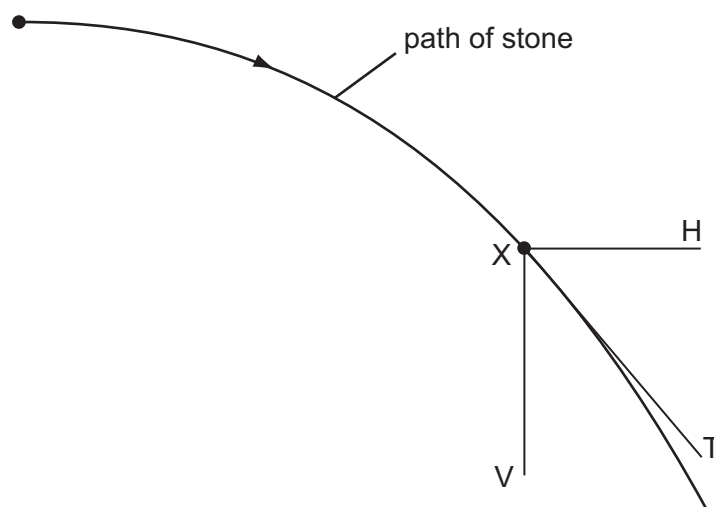
- 27 A car driver sharply presses down the accelerator when the traffic lights go green. The resultant horizontal force acting on the car varies with time as shown.



Which graph shows the variation with time of the speed of the car?



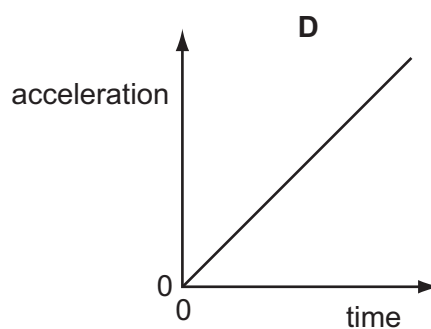
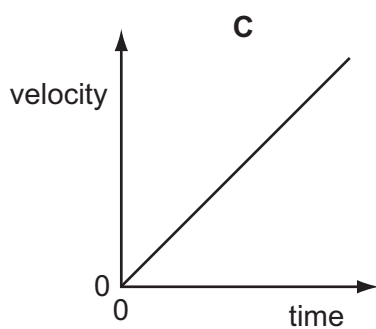
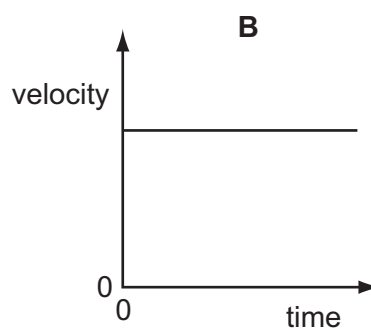
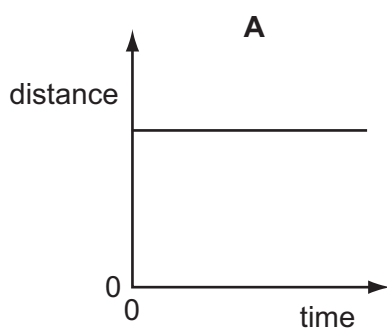
- 28** A stone is projected horizontally in a vacuum and moves along a path as shown. X is a point on this path. XV and XH are vertical and horizontal lines respectively through X. XT is the tangent to the path at X.



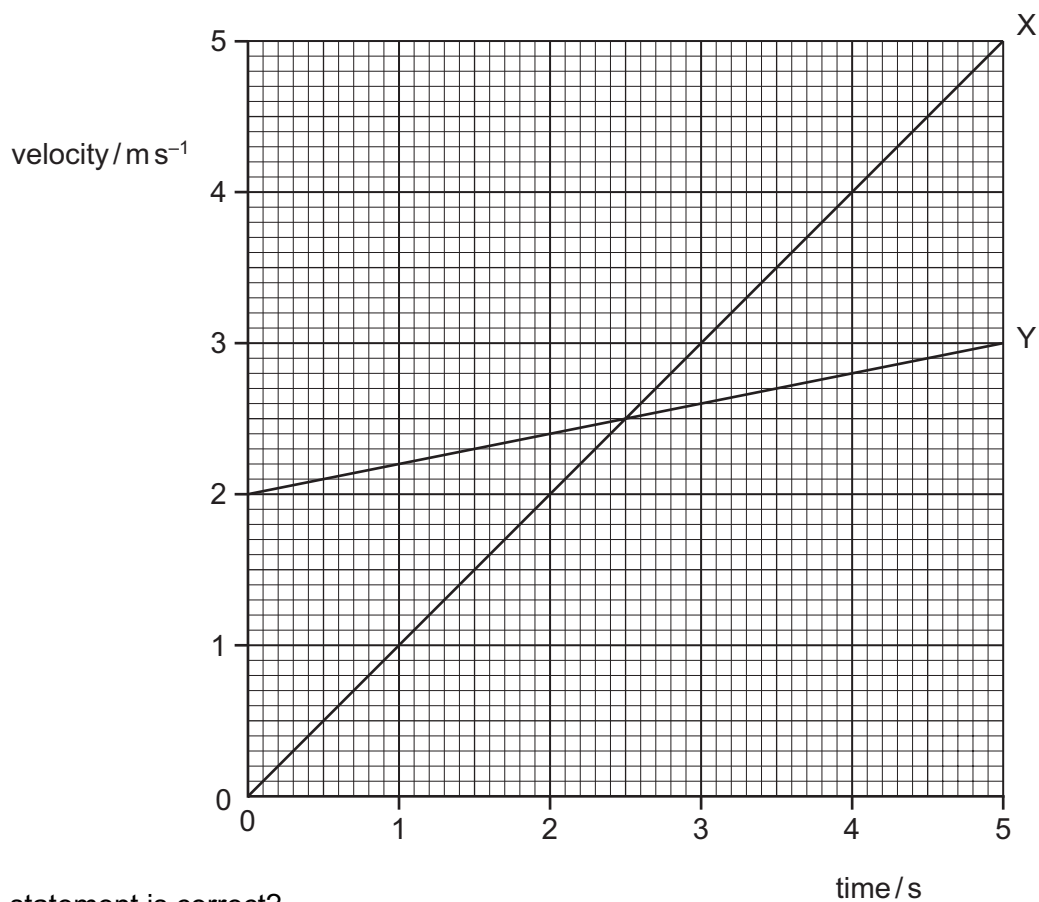
Along which direction or directions do forces act on the stone at X?

- A** XV **B** XH **C** XV and XH **D** XT
- 29** A particle is moving in a straight line with uniform acceleration.

Which graph represents the motion of the particle?



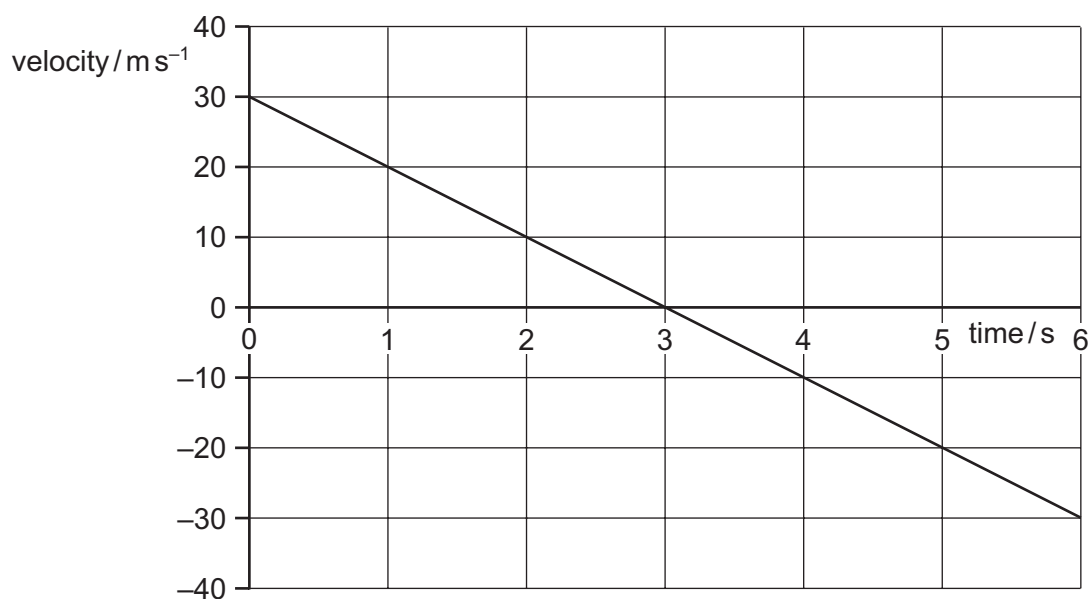
- 30 The graph shows velocity-time plots for two vehicles X and Y. The accelerations and distances travelled by the two vehicles can be estimated from these plots.



Which statement is correct?

- A The accelerations of X and Y are the same at 2.5 s.
- B The initial acceleration of Y is greater than that of X.
- C The distance travelled by X is greater than that travelled by Y in the 5 s period.
- D The distances travelled by X and Y in the 5 s period are the same.

- 31 A stone is thrown vertically upwards. A student plots the variation with time of its velocity.



What is the vertical displacement of the stone from its starting point after 5 seconds?

- A** 20 m **B** 25 m **C** 45 m **D** 65 m
- 32 Which graph represents the motion of a car that is travelling along a straight road with a speed that increases uniformly with time?

