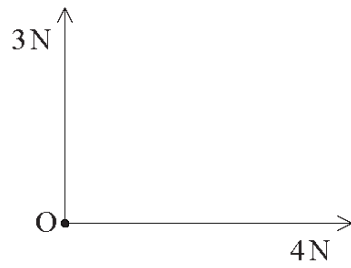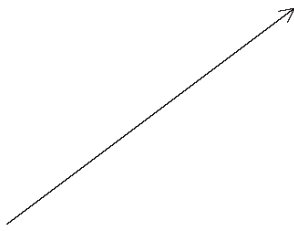The vector diagram shows two forces acting on a point object O. The forces are in the plane of the page.
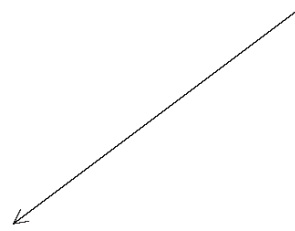

3 N

O

4 N

Another 5 N force is applied to O in the plane of the page. Which of the following gives the direction of this force to ensure that O is in equilibrium?
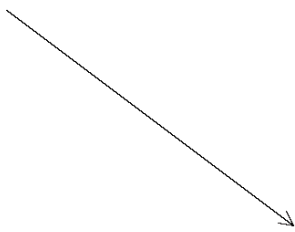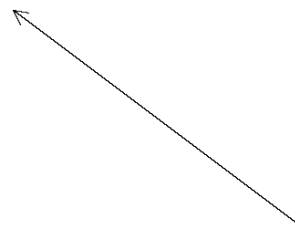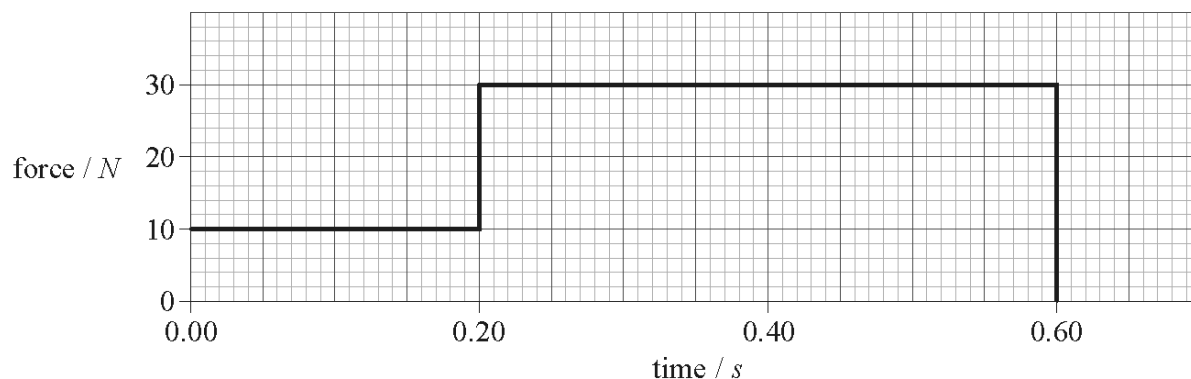
A.

B.

C.

D.

The graph shows how an external force applied to an object of mass 2.0 kg varies with time. The object is initially at rest.

What is the speed of the object after 0.60 s?

A. $7.0 \, \mathrm{m \, s^{-1}}$

B. $14 \, \mathrm{m \, s^{-1}}$

C. $18 \, \mathrm{m \, s^{-1}}$

D. $28 \, \mathrm{m \, s^{-1}}$

A ball is thrown horizontally from the top of a high cliff. Air resistance is negligible.

Which of the following correctly describes the changes, if any, to the ball's vertical speed and horizontal speed?

|	Vertical speed	Horizontal speed
A.	no change	increases
B.	increases	no change
C.	no change	decreases
D.	decreases	no change

A stone is thrown vertically upwards from the surface of Earth. Which of the following quantities will **not** become zero while the stone is in the air?

A.   Speed

B.   Velocity

C.   Momentum

D.   Acceleration

An ice-hockey puck is slid along ice in a straight line. The puck travels at a steady speed of $20\,\mathrm{m\,s^{-1}}$ and experiences no frictional force. How far does the puck travel in $2.5\,\mathrm{s}$?

A. $5\,\mathrm{m}$

B. $8\,\mathrm{m}$

C. $25\,\mathrm{m}$

D. $50\,\mathrm{m}$

A block of weight W slides down an inclined plane at a constant speed.
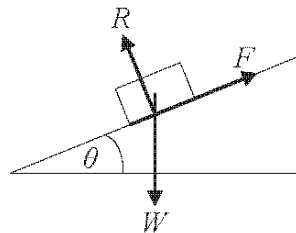
The normal reaction acting between the block and the plane is R and the frictional force between the block and the plane is F. The incline is at an angle θ to the horizontal. What is the magnitude of F?

A. $R\cos\theta$

B. $R\sin\theta$

C. $W\cos\theta$

D. $W\sin\theta$

An egg dropped on the floor is likely to break. However, when it is wrapped in a cloth it is less likely to break. This is because the cloth

A. increases the time for which the force of the ground acts on the egg.

B. reduces the momentum of the egg.

C. reduces the change of momentum of the egg.

D. reduces the impulse acting on the egg.

The diagram below shows the forces acting on a block of weight W as it slides down a slope. The angle between the slope and the horizontal is θ, the normal reaction force on the block from the slope is N and friction is negligible.
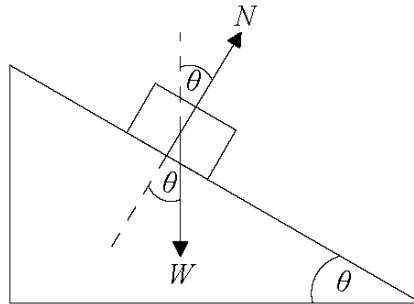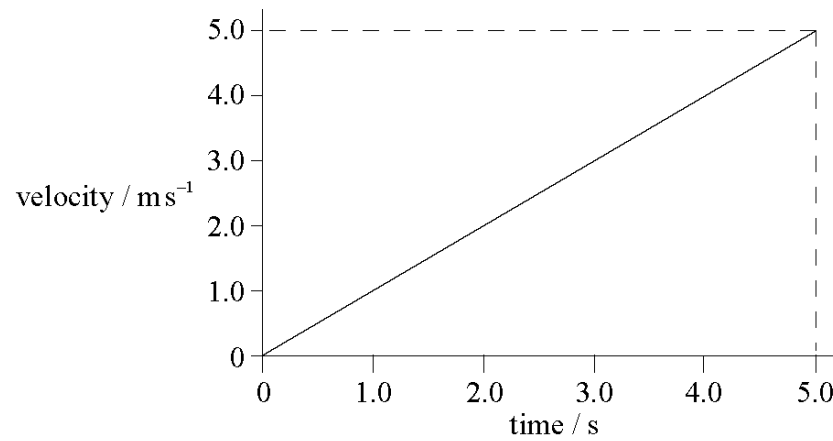

Which of the following gives the resultant force on the block?

A. $W \sin \theta$

B. $W \cos \theta$

C. $N \sin \theta$

D. $N \cos \theta$

What is the order of magnitude of the mass, in kg, of an apple?

A. 10^{-3}

B. 10^{-1}

C. 10^{+1}

D. 10^{+3}

The velocity–time graph for an accelerating object that is travelling in a straight line is shown below.

Which of the following is the change in displacement of the object in the first 5.0 seconds?

A.   25.0 m

B.   12.5 m

C.   5.0 m

D.   1.0 m

The diagram below shows the forces acting on a block of weight W as it slides down a slope. The angle between the slope and the horizontal is θ, the normal reaction force on the block from the slope is N and friction is negligible.
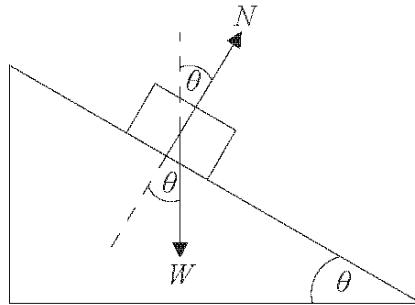
Which of the following gives the resultant force on the block?

A. $W \sin\theta$

B. $W \cos\theta$
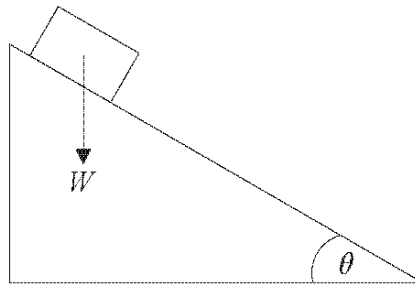
C. $N \sin\theta$

D. $N \cos\theta$

The graph shows the acceleration a of an object as time t varies.
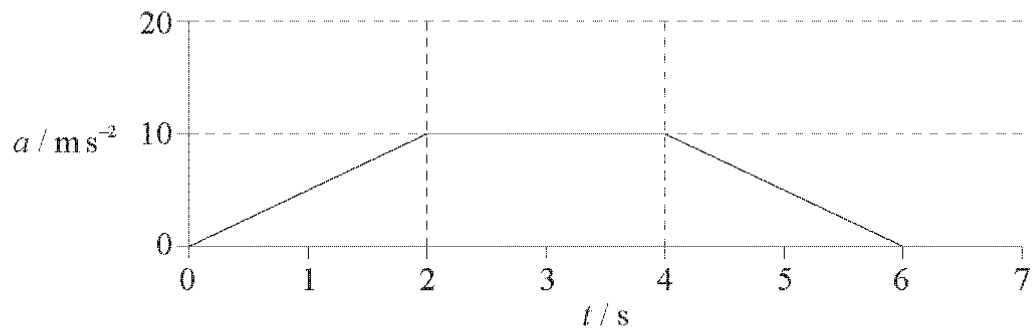
What is the magnitude of the change in the velocity of the object between 0 and 3 seconds?

A. $5\,\mathrm{m\,s^{-1}}$

B. $10\,\mathrm{m\,s^{-1}}$

C. $20\,\mathrm{m\,s^{-1}}$

D. $30\,\mathrm{m\,s^{-1}}$

An object slides down an inclined plane that makes an angle θ with the horizontal. The weight of the object is W.
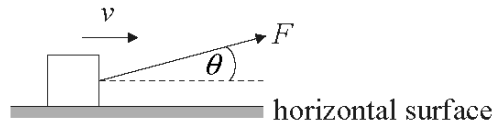

Which of the following is the magnitude of the component of the weight parallel to the plane?

A. $W \sin \theta$

B. $\dfrac{W}{\sin \theta}$

C. $W \cos \theta$

D. $\dfrac{W}{\cos \theta}$

The momentum of an object changes by Δp in a time Δt. What is the impulse acting on the object during this change?
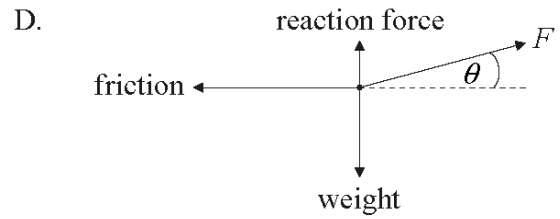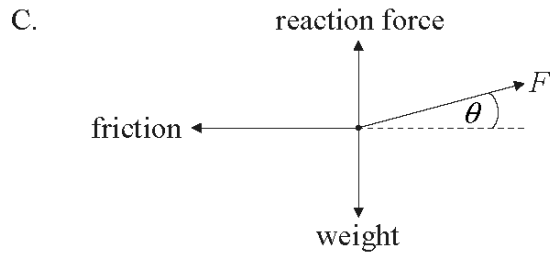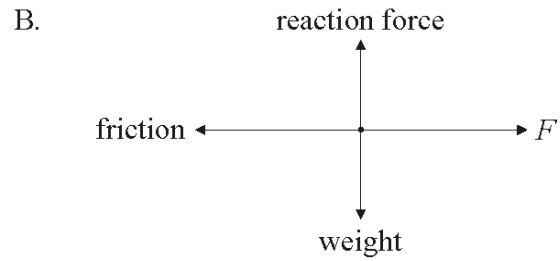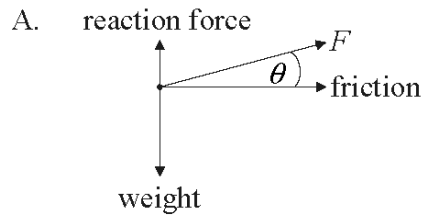
A. Δp

B. $\Delta p \, \Delta t$

C. $\dfrac{\Delta p}{\Delta t}$

D. zero

A force F acts on a block at an angle θ with respect to a horizontal surface.
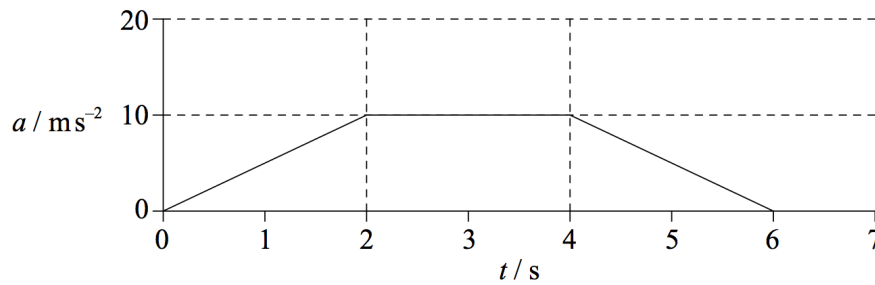

horizontal surface

The block is moving with a constant velocity v along the surface. A resistive force acts on the block.

Which of the following correctly represents the forces acting on the block?

A.   reaction force

weight

B.   reaction force

weight

C.   reaction force

weight

D.   reaction force

weight

The graph shows the acceleration a of an object as time t varies.

$a\,/\,\mathrm{ms}^{-2}$

$t\,/\,\mathrm{s}$

What is the magnitude of the change in the velocity of the object between 0 and 3 seconds?

A. $5\,\mathrm{ms}^{-1}$

B. $10\,\mathrm{ms}^{-1}$

C. $20\,\mathrm{ms}^{-1}$

D. $30\,\mathrm{ms}^{-1}$

A student makes three statements about situations in which no work is done on an object.
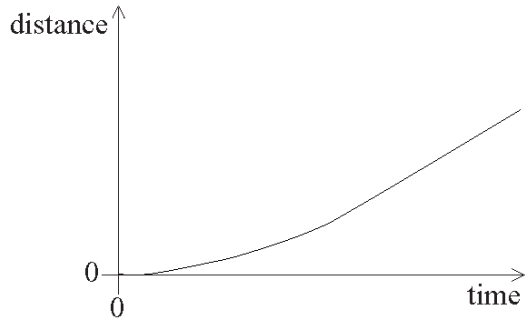
    I.   The object is moving with uniform circular motion.

    II.   A force is applied to the object in the direction of its velocity.

    III.   A force is applied to the object in a direction opposite to its motion.
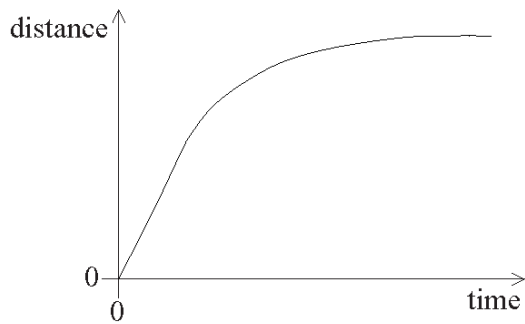
Which of the above statements is/are correct?

A.   I only

B.   I and II only

C.   I and III only

D.   III only

An object falls vertically from rest. Air resistance acts on the object and it reaches a terminal speed.
Which of the following is the distance–time graph for its motion?
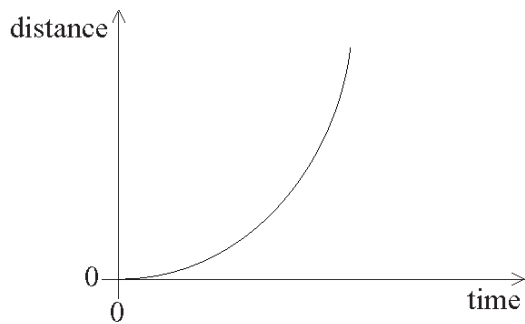
A.

distance

0

0
time

B.

distance

0

0
time

C.

distance

0

0
time

D.

distance

0

0
time