Which of the following is a correct definition of work?

A. Product of force and distance

B. Product of force and distance moved in the direction of the force

C. Product of power and time

D. Product of force and displacement

Which of the following may be determined from a speed-time graph?

A. Displacement

B. Distance

C. Power

D. Force

A wooden block is sliding down an inclined plane at constant speed. The magnitude of the frictional force between the block and the plane is equal to

A. zero.

B. the magnitude of the weight of the block.

C. the magnitude of the component of weight of the block parallel to the plane.

D. the magnitude of the component of the normal reaction parallel to the plane.

The time taken for a stone dropped from rest to fall vertically through 16m is 2.0s. Based on these measurements, what is the best estimate for the acceleration of free fall?

A. $4.0 \mathrm{ms}^{-2}$

B. $8.0 \mathrm{ms}^{-2}$

C. $9.8 \mathrm{ms}^{-2}$

D. $10 \mathrm{ms}^{-2}$

Which of the following is a correct statement of Newton's second law of motion?

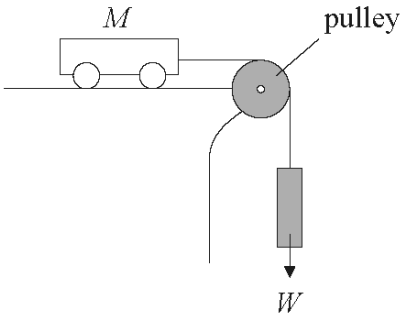
A. A force acting on a body is proportional to the mass of the body.

B. The rate of change of momentum of a body is equal to the net external force acting on the body.

C. The momentum of a body is proportional to the net external force acting on the body.

D. A force acting on a body is proportional to the acceleration of the body.

A cart of mass M is on a horizontal frictionless table.



The cart is connected to an object of weight W via a pulley. Which of the following is the acceleration of the cart?

A. $\dfrac{M+\dfrac{W}{g}}{W}$

B. $\dfrac{W}{M+\dfrac{W}{g}}$

C. $\dfrac{Mg}{W}$

D. 0

Which of the following quantities can be determined from a speed-time graph of a particle travelling in a straight line?

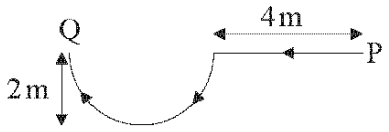
A. Only the magnitude of the acceleration at a given instant

B. Both the velocity and the acceleration at a given instant

C. Only the distance travelled in a given time

D. Both the distance travelled in a given time and the magnitude of the acceleration at a given instant

Samantha walks along a horizontal path in the direction shown. The curved part of the path is a semi-circle.



The magnitude of her displacement from point P to point Q is approximately

A. 2 m.

B. 4 m.

C. 6 m.

D. 8 m.

Two balls of different mass are dropped from the top of a tall building one after the other. The distance between the balls

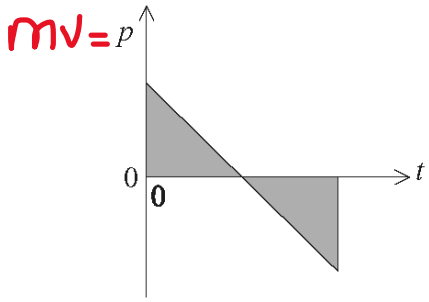
A. increases with time.

B. depends on the initial velocity only.

C. remains constant.

D. depends on the mass of the balls.

A rubber ball, travelling in a horizontal direction, strikes a vertical wall. It rebounds at right angles to the wall. The graph below illustrates the variation of the ball's momentum p with time t when the ball is in contact with the wall.



Which of the following statements is true?

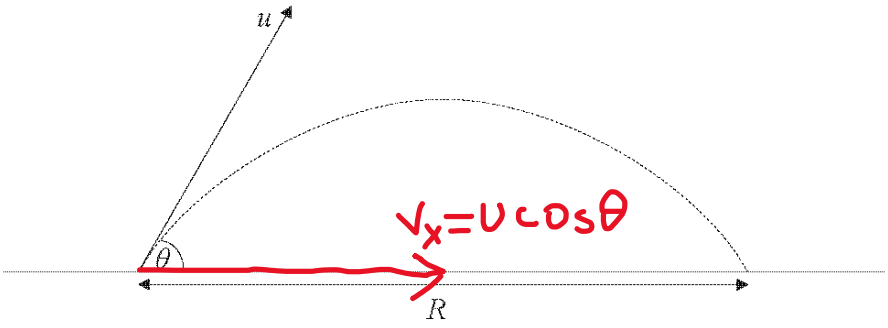
A. The shaded area is equal to the force exerted by the wall on the ball.

B. The shaded area is equal to the force exerted by the ball on the wall.

C. The gradient is equal to the force exerted by the wall on the ball.

D. The gradient is equal to the force exerted by the ball on the wall.

A football is kicked with an initial velocity u at an angle θ to the horizontal and reaches the ground t seconds later.



Ignoring air resistance what is the range R of the football?

A. ut

B. $ut\cos\theta$

C. $ut\sin\theta$

D. $ut\tan\theta$

Which of the following represents a scalar and a vector quantity?

	Scalar	Vector
A.	electric potential	electric potential gradient
B.	electric potential gradient	electric potential
C.	electric potential	electric potential difference
D.	electric potential gradient	electric field

A vehicle is driven up a hill at constant speed. Which of the following best describes the energy changes involved?

A. Chemical energy is converted into gravitational potential energy.

B. Chemical energy is converted into gravitational potential energy, sound and thermal energy.

C. Gravitational potential energy is converted into chemical energy.

D. Gravitational potential energy is converted into chemical energy, sound and thermal energy.

If a moving object is subject to a constant force, which of the following can be correctly deduced from Newton's first law?

A. The object continues to move with a changing velocity.

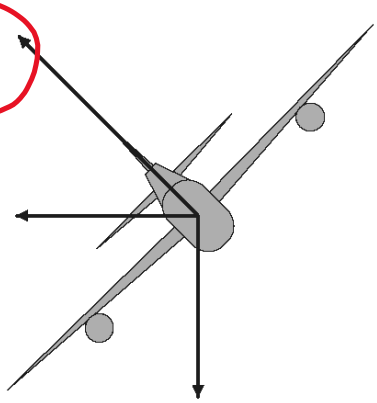
B. The object continues to move with a constant velocity.

C. The object continues to move with a changing direction.

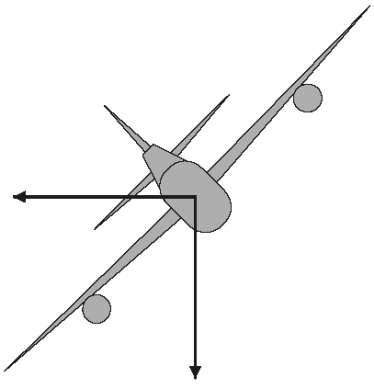
D. The object continues to move in the same direction.

An aircraft is flying at constant speed in a horizontal circle. Which of the following diagrams best illustrates the forces acting on the aircraft in the vertical plane?

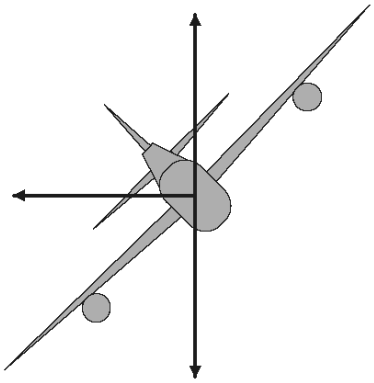
A.



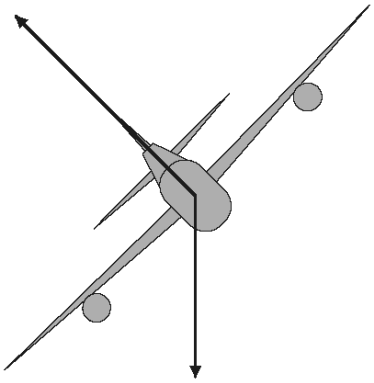
B.



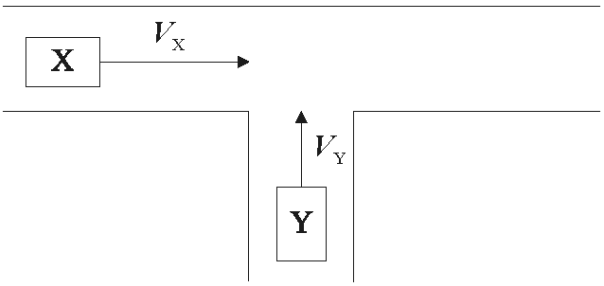
C.



D.

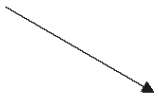


Two cars, X and Y, are travelling towards a junction. The velocity of car X is V_X and car Y is V_Y.

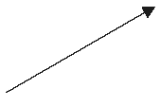


Which of the following vectors represent the velocity of Y relative to X?

A.



B.



C.

D.