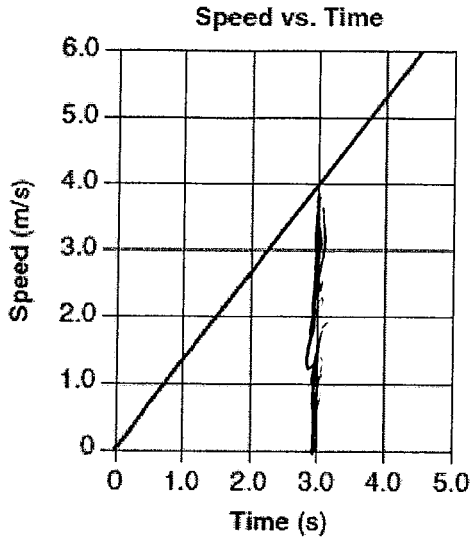
3

Figure 1

Base your answer to the question on the information and graph below and on your knowledge of physics.

The graph below represents the speed of a marble rolling down a straight incline as a function of time.



Area under curve gives displacement

$A = \frac{b \cdot h}{2}$

$A = \frac{(3\,s)(4\,m/s)}{2} = 12\,m$

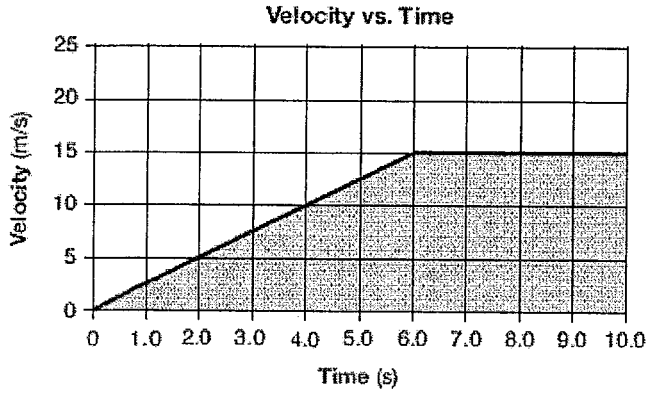
Refer to Figure 1 and answer the following Question:

Calculate the distance the marble travels during the first 3.0 seconds. [Show all work, including the equation and substitution with units.]

4

Figure 2

Base your answer to the question on the graph below, which represents the relationship between velocity and time for a car moving along a straight line, and your knowledge of physics.

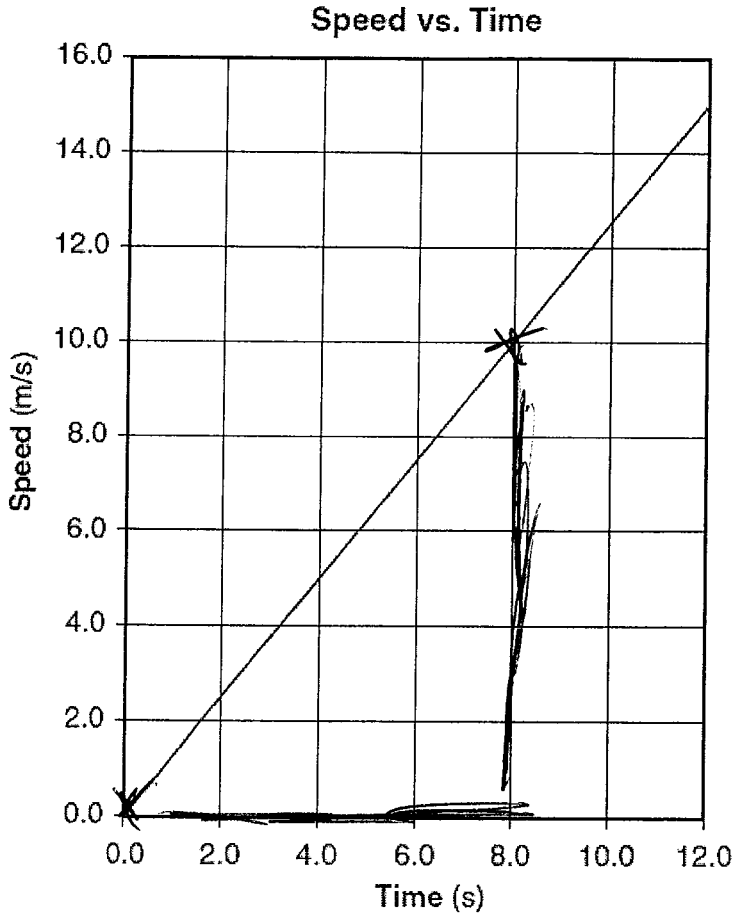


Refer to Figure 2 and answer the following Question:

Identify the physical quantity represented by the shaded area on the graph.

displacement

5 Base your answer to the question on the information and graph below.
The graph below shows the relationship between speed and elapsed time for a car moving in a straight line.



Slope gives acceleration.

$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

$\text{Slope} \quad \frac{10\frac{m}{s} - 0\frac{m}{s}}{8s - 0s} = \frac{10\frac{m}{s}}{8s}$

$\text{Slope} = 1.25\,m/s^2$

Part (A): Determine the magnitude of the acceleration of the car.

Part (B): Calculate the total distance the car traveled during the time interval 4.0 seconds to 8.0 seconds. [Show all work, including the equation and substitution with units.]

6 A ball is thrown straight upward from the surface of Earth. Which statement best describes the ball's velocity and acceleration at the top of its flight?

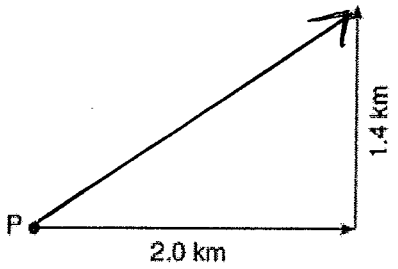
1 Both velocity and acceleration are zero.
2 Velocity is zero and acceleration is nonzero.
3 Velocity is nonzero and acceleration is zero.
4 Both velocity and acceleration are not zero.

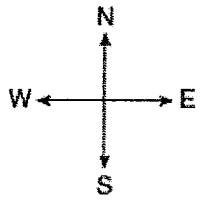
11

Figure 3

Base your answer to the question on the information and vector diagram below and on your knowledge of physics.

A hiker starts at point *P* and walks 2.0 kilometers due east and then 1.4 kilometers due north. The vectors in the diagram below represent these two displacements.





Refer to Figure 3 and answer the following Question:

Using a protractor, determine the angle between east and the hiker's resultant displacement.

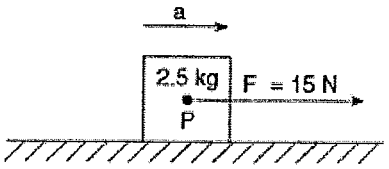
Using A protractor I measured 35°

21

Figure 4

Base your answer to the question on the information and diagram below and on your knowledge of physics.

As represented in the diagram below, a constant 15-newton force, F, is applied to a 2.5-kilogram box, accelerating the box to the right at 2.0 meters per second squared across a rough horizontal surface.



Given

$F_A = 15N$ $F_f = ?$

$m = 2.5kg$

$a = 2m/s^2$

$F_{net} = ma$

$F_f + F_A = ma$

$F_f + 15N = (2.5kg)(2m/s^2)$

$F_f + 15N = 5N$

$F_f = -10N$

Refer to Figure 4 and answer the following Question:
Determine the magnitude of the force of friction on the box.

22 **Refer to Figure 4 and answer the following Question:**
Calculate the magnitude of the net force acting on the box. [Show all work, including the equation and substitution with units.]

23 $F_{net} = ma$

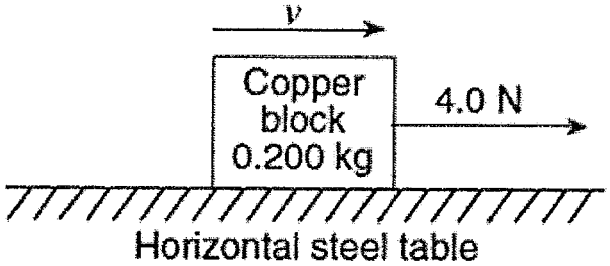
$F_{net} = (2.5kg)(2m/s^2)$

$F_{net} = 5N$

Figure 5

Base your answer to the question on the information below and on your knowledge of physics.

The diagram below represents a 4.0-newton force applied to a 0.200-kilogram copper block sliding to the right on a horizontal steel table.



Refer to Figure 5 and answer the following Question:
Determine the magnitude of the net force acting on the moving block.

Find the weight and NORMAL force.

$F_Z = m_Z$

$F_g = (.2kg)(9.8m/s^2)$

$F_Z = -1.96Nz$

Therefore

$F_N = 19.62N$

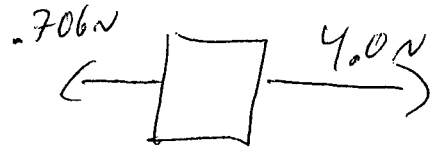
Now Find force of friction.

$f_f = \mu F_N$

$f_f = (.36)(1.962N)$

$f_f = 0.706N$

now find net force



$F_{net} = 4.0N - .706N$

$F_{net} = 3.294N$