

## Forces Quiz 1.6

Fill in the blanks.

- 1 The property of an object that resists changes in its state of rest or motion is called inertia.
- 2 Free body diagrams are used to analyze (not solve) problems in physics dealing with dynamics.
- 3 Unless acted upon by a(n) net force, an object at rest or in uniform motion will remain at rest or in uniform motion.
- 4 When an unbalanced force acts on an object, the object accelerates.
- 5 A net force of 1N gives a mass of 1 kg an acceleration of  $1 \text{ m/s}^2$ .

## Graphing

1. Draw a position-time graph for a rock that free falls from the edge of a cliff to the ground below.

See attached sheet

Answer the following questions.

- a) What is the acceleration of the rock? Since the rock is in free fall, the acceleration will be  $9.8 \text{ m/s}^2$  [down]

- b) Determine the position of the rock at  $t = 2.5 \text{ s}$  and  $t = 4 \text{ s}$ .

At  $t = 2.5 \text{ s}$  the position will be 120 m above ground.  
At  $t = 4 \text{ s}$  the position will be 72 m above ground

- c) Determine the average velocity of the rock between the interval of

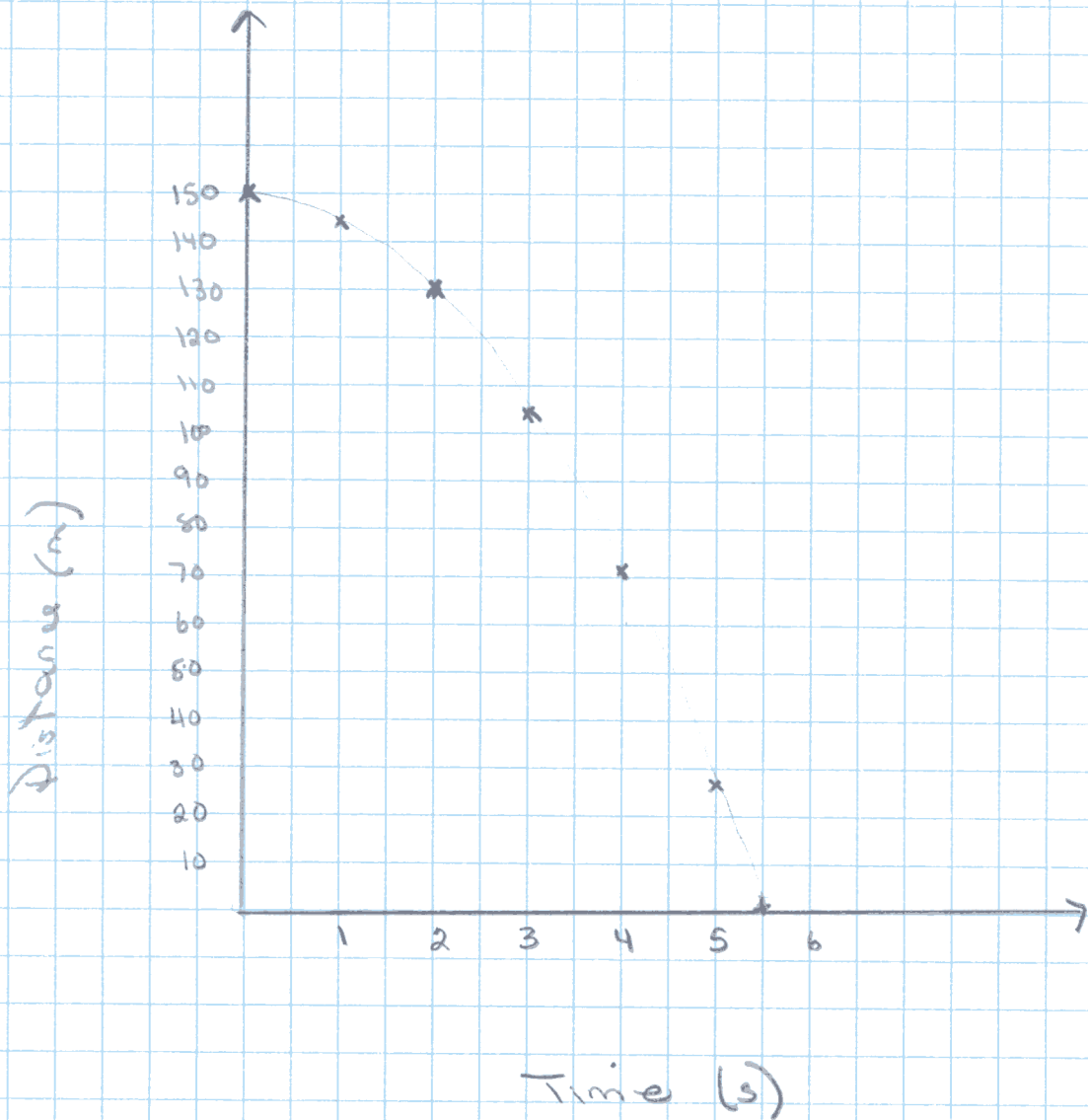
- i.  $t = 1 \text{ s}$  and  $2 \text{ s}$ .

Determine the slope of the straight line between  $t = 1$  and  $2 \text{ s}$

$$\vec{v}_{av} = \frac{d_2 - d_1}{\Delta t} = \frac{130 - 145}{2 - 1} = \underline{-15 \text{ m/s}}$$

- ii.  $t = 4 \text{ s}$  and  $5 \text{ s}$ .

$$\vec{v}_{av} = \frac{d_2 - d_1}{\Delta t} = \frac{27.5 - 72}{5 - 4} = \underline{-44.5 \text{ m/s}}$$



At  $t=1$   $\Delta d = 145.1$  m

$t=2$   $\Delta d = 130.4$

$t=3$   $\Delta d = 105.9$

$t=4$   $\Delta d = 71.6$

$t=5$   $\Delta d = 27.5$

$t=5.5$   $\Delta d = 2$

used  $\Delta d = v_1 \Delta t + \frac{1}{2} a \Delta t^2$

where  $v_1 = 0$

$a = 9.8 \text{ m/s}^2$