Unit P1 Review (Motion) - Part I

1. Define the following terms in your own words.

    (a) Velocity:
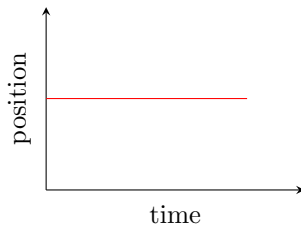
    Solution: how fast an object is moving and its direction (measured in m/s)
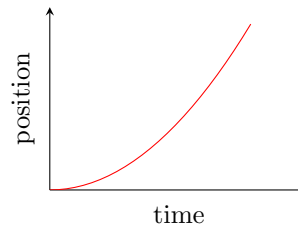
    (b) Acceleration:

    Solution: the rate that velocity changes (measured in m/s/s or m/s^2)
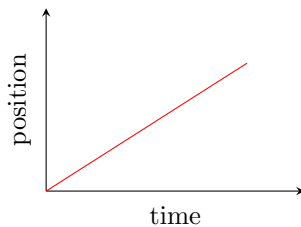
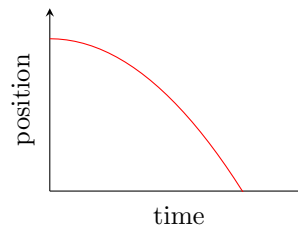2. Draw the following distance-time graphs.
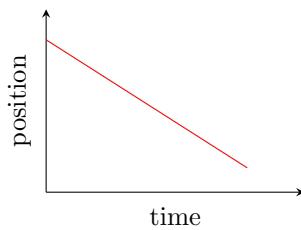
    (a) Not moving

    (b) Forward at a constant speed

    (c) Backward at a constant speed

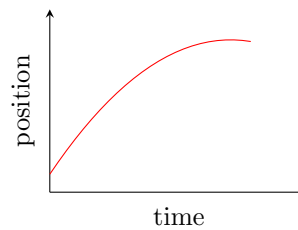   (d) Forward and speeding up

    (e) Backward and speeding up

    (f) Forward and slowing down

3. How much time does it take for a car to travel at 28.4 m/s to travel 3000 meters?

    Solution:

    $$v = 28.4\,\text{m/s}$$

    $$d = 3000\,\text{m}$$

    $$v = \frac{d}{t}$$

    $$28.4 = \frac{3000}{t}$$

    $$t = 105.63\,\text{s}$$

4. If a car is initially traveling forward at 15 m/s, how fast will it be going in 1.2 seconds if the acceleration is -10 m/s/s?

Solution:

$$v_i = 15\,\text{m/s}$$

$$t = 1.2\,\text{s}$$

$$a = -10\,\text{m/s}^2$$

$$a = \frac{(v_f - v_i)}{t}$$

$$-10 = \frac{(v_f - 15)}{1.2}$$

$$v_f = 3\,\text{m/s}$$

5. What is the speed of an object that travels 35 meters in 9 seconds?

Solution:

$$d = 35\,\text{m}$$

$$t = 9\,\text{sec}$$

$$v = \frac{d}{t}$$

$$v = \frac{35}{0}$$

$$t = 3.89\,\text{m/s}$$

6. Draw a graph for the following situation:

   (a) I start at school and drive forward 2 miles in 4 minutes.

   (b) Then I get stopped at a red light for 1 minute.

   (c) The light turns green and I go forward 2 miles in 5 minutes.

   (d) I turn around and go back to school because I forgot my phone. It makes me 6 minutes to get back.

   (e) It then takes me 4 minutes to go 1 mile forward because of traffic.