Part I

1. An object goes from one point in space to another. After it arrives at its destination

    (a) its displacement is the same as its distance traveled.

    (b) its displacement is always greater than its distance traveled.

    (c) its displacement is always smaller than its distance traveled.

    (d) its displacement is never larger than its distance traveled.

2. An accelerating body must at all times

    (a) have positive velocity.

    (b) have an increasing speed.

    (c) have a changing direction.

    (d) have a changing velocity.

3. The diagram below shows a piece of a ticker tape which passed through a vibrating marker which vibrated at a constant rate of 20 s^{-1}
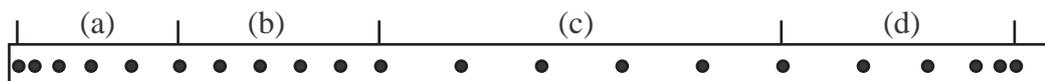
    Which region shows where the magnitude of the acceleration was greatest?

4. The motion of a particle is described by the position-time graph shown below. During which interval is the *instantaneous* velocity of the particle greatest?
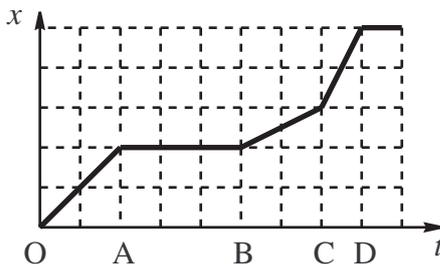
    (a) OA   (b) AB   (c) BC   (d) CD

5. For the above position-time graph during which interval is the *average* velocity greatest.

   (a) OA   (b) OB   (c) OC   (d) OD

Part II

1. A car travels 120 km along a road at 40 km/hr and then immediately returns along the same road at a speed of 60 km/hr.

    (a) How long does each leg of the trip take?

    (b) What is the average speed for the round trip?

    (c) What is the average velocity for the round trip?

2. The following graphs show the motion of a toy car along a straight track. For each situation describe the motion and complete and sketch the missing graph.
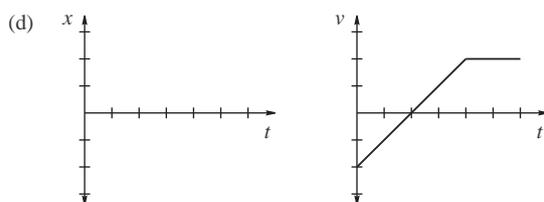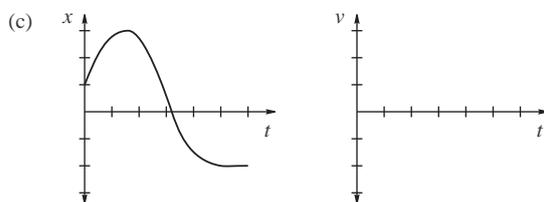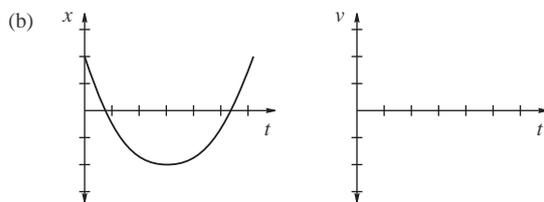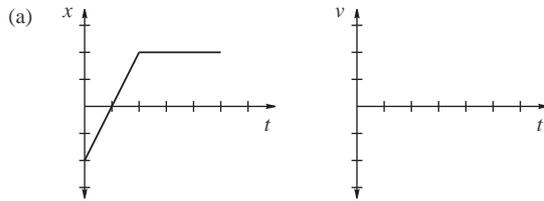
3. The phrases "slows down" and "decreases velocity" do not have identical physical meaning. Describe each of the following physical situations using the appropriate phrase. When both are appropriate indicate this, when neither are appropriate indicate this also.

   (a) An object increasing its speed traveling in the negative direction

   (b) An object decreasing its speed traveling in the positive direction

   (c) An object increasing its speed traveling in the positive direction

   (d) An object decreasing its speed traveling in the negative direction.

4. A sprinter in a 100 dash accelerates uniformly from rest reaching a top speed of 14.7 m/s after 6.00 seconds. He then runs at constant speed for the remainder of the race.

   (a) What is his rate of acceleration during the initial phase of the race?

   (b) How far did he travel in the first phase of the race?

   (c) What was his time in the race?

   (d) What was his average acceleration over the entire race?

   (e) What was his average speed over the entire race?