

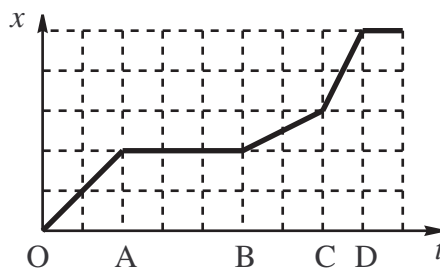
## Part I

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  $20 \text{ s}^{-1}$



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

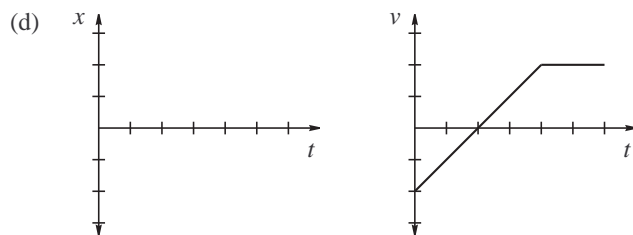
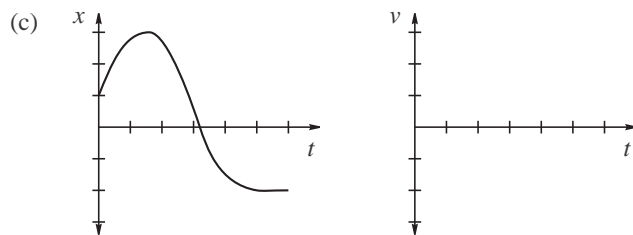
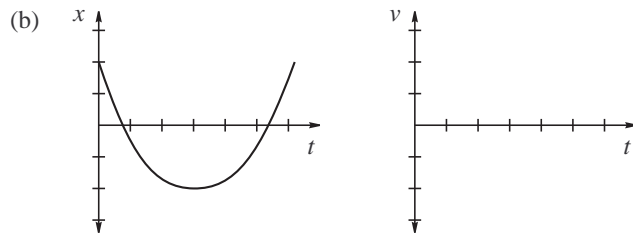
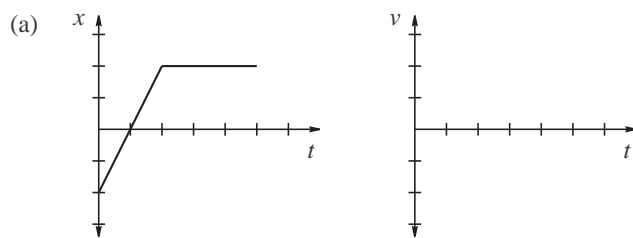
## Part II

1. An ant walks clockwise around this sheet of paper starting from the top left hand corner traveling at  $0.03 \text{ m/s}$ .

(a) How far will the ant have walked after 20 seconds?

(b) What will the displacement of the ant be after 20 seconds?

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  $14.7 \text{ m/s}$  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?