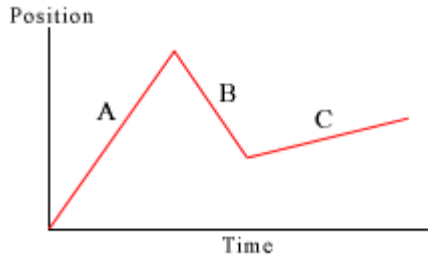## Problem 1

MULTIPLE CHOICE. Choose the one alternative that best answers the question.

A) The following graph shows a three-part motion. For each of the three parts, A, B, and C, identify the direction of the motion. Positive velocity denotes motion to the right.

a) A = right   B = right   C = right
b) A = right   B = left   C = right
c) A = right   B = right   C = left
d) A = right   B = left   C = left
e) A = left   B = right   C = left
f) A = left   B = right   C = right
g) A = left   B = left   C = left

B) What is the acceleration of a car that maintains a constant velocity of 100 km/hr for 10 seconds?

a) 0
b) 10 km / hr s
c) 10 m / hr s
d) 100 km / hr s
e) 1000 km / hr s

C) At one instant an object is moving upwards with a speed of 50 m/s. One second later its speed is approximately

a) 50 m/s
b) 60 m/s
c) 40 m/s
d) 55 m/s
e) 100 m/s

D) The following graph shows projectile motion at three points along the trajectory. The speeds at the points are v_1, v_2, and v_3. Assume there is no air resistance and rank the speeds, largest to smallest.
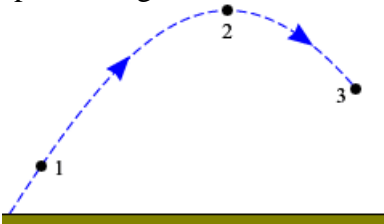
a) $v_1 > v_2 > v_3$
b) $v_1 > v_3 > v_2$
c) $v_2 > v_1 > v_3$
d) $v_2 > v_3 > v_1$
e) $v_3 > v_1 > v_2$
f) $v_3 > v_2 > v_1$

E) Two objects are fired into the air, and the drawing shows the projectile motions. Projectile 1 reaches the greater height, but projectile 2 has the greater range. Which one is in the air for the greatest amount of time?
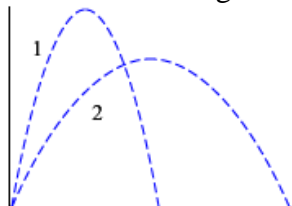
a) projectile 2, because it has the greater range
b) projectile 2, because it has the smaller initial speed and, therefore, travels more slowly than projectile 1
c) both spend the same amount of time in the air
d) projectile 1, because it travels higher than 2

Problem 2

The graph shows velocity vs time for a particle moving in one dimension. The positive direction is to the right.
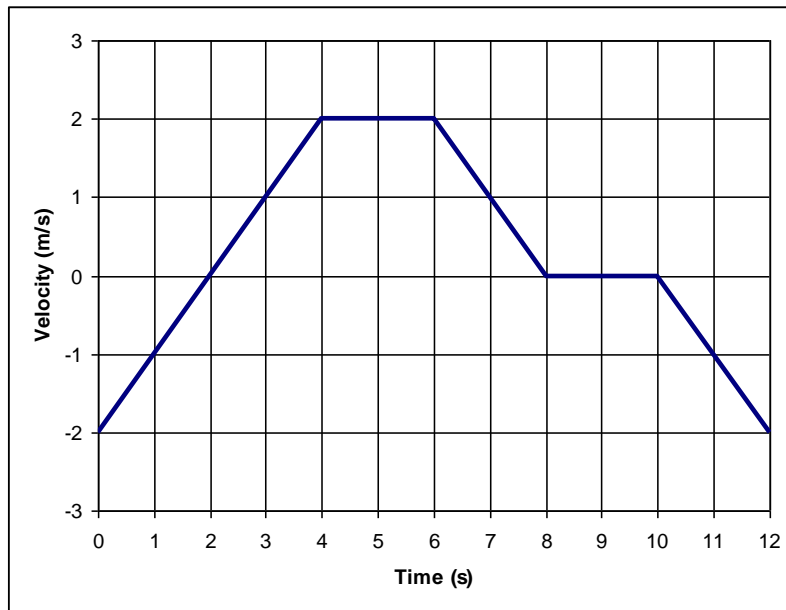
a) At what time, or during what time periods, is the object at rest?

b) At what time, or during what time periods, is the object slowing down and moving to the right?

c) At what time, or during what time periods, is the object's acceleration constant?

Problem 3

You are a stunt person in the latest action movie and need to drive a car off a cliff, parachute out to safety, and let the car freefall to the bottom of the cliff. You must leave the cliff at a specific speed, so the car lands on the target below. You start from rest, hit the gas, and accelerate at a constant rate of 11 m/s^2 for 7.5 seconds, when you realize you are going too fast. You apply the brakes for 5 seconds, slowing your car down with a constant acceleration of -4.5 m/s^2. The car leaves the cliff traveling horizontally, you parachute out, and the car hits the target 30 meters below. How far from the cliff is the target?