Please complete the following homework assignment in the spaces provided. Your completed assignment is due on January 17th at 9:30 am.

1. A car is moving at a constant speed of 30 km/hr. The driver then presses harder on the accelerator causing an acceleration of 2.25 km/hr/sec, which she maintains for 4 seconds. How fast is the car moving at the end of 4 seconds?

   From the definition of acceleration we know that $a = \dfrac{\Delta v}{t} \Rightarrow \Delta v = at = (2.25)(4) = 9$ km/hr. Thus the care is moving at 39 km/hr after 4 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.
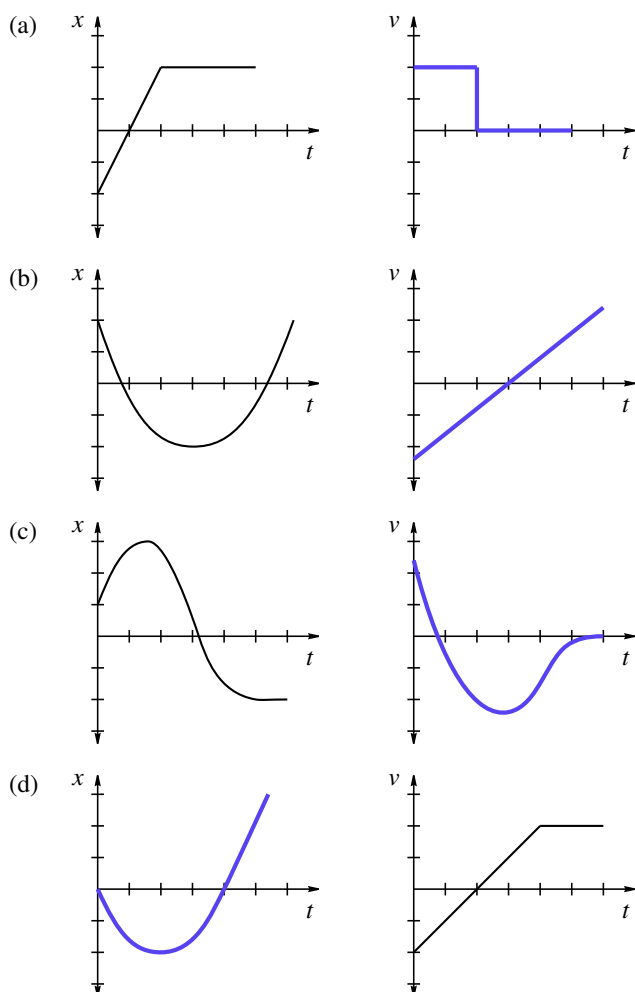
3. An ant walks clockwise around this sheet of paper starting from the top left hand corner traveling at 1.2 inches per second. (Letter Size paper is 8.5 in × 11).

(a) How far will the ant have walked after 20 seconds?
$d = vt = 1.2 \times 20 = 24$ inches

(b) How far is the ant from from its starting point after 20 seconds?

8.5 inch

O

Since the ant travels a distance 24 inches around the paper it arrives point P on the diagram on the right.
By Pythagoras' Theorem the displacement OP is
$\sqrt{(11^2 + (8.5 - 4.5)^2} = 11.7$ inches

11 inch

P   4.5 inch
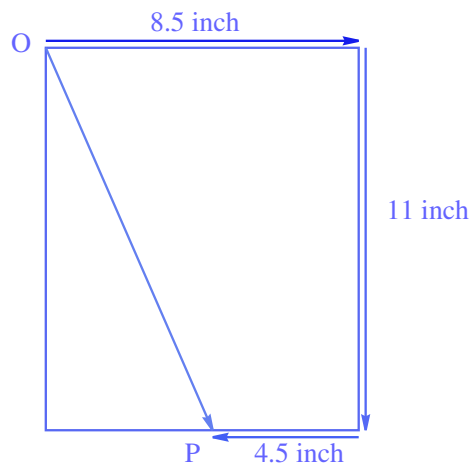
(c) Hence find its average velocity during this time interval?
The average velocity is $\dfrac{11.7}{20} = 0.585$ m/s

4. 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?
Since $v = d/t$ it follows that $t = d/v$, so that for the first leg $t = 120/40 = 3$ hr. For the second leg $t = 120/6 = 2$ hr.

(b) What is the average speed for the round trip?
The average speed is total distance over total time, which is $\dfrac{120 + 120}{3 + 2} = 48$ km/hr

(c) What is the average velocity for the round trip?
Since the car returns to its starting point the average velocity is zero.