Read 2.4

H.W #1 Due wednesday
(no class ~~monday~~)

office hours

Jinfeng Tang   m 12:30 - 1:30
                m 2:30 - 4:30
                   Rm 407

mike savoy   m 4:30 - 5:30
              F 1:30 - 3:30
                 Rm 365

Syllabus updated

Interactive Question

You jog around a 400 m track in 100 seconds, returning to the place where you started. Which of the following statements is true?

A) Your average speed and average velocity are the same, and neither is zero.

B) Your average speed and average velocity are the same, and both are zero.

C) Your average velocity is zero, and your average speed is 4 m/s.

D) Your average speed is zero, and your average velocity is 4 m/s.

Interactive Question

There are many instruments and gauges in your car. If you want to know your instantaneous velocity which would you have to look at?

A) Your speedometer only
B) Your odometer only
C) Your compass only
D) Your speedometer and your odometer
E) Your speedometer and your compass

Interactive Question

A car goes around a corner at a constant speed of 30 mi/hr.
Which of the following is true?

A) The speed is changing but the velocity is not.

B) The velocity is changing but the speed is not.

C) Both the speed and velocity are changing.

D) Neither the speed nor the velocity are changing.
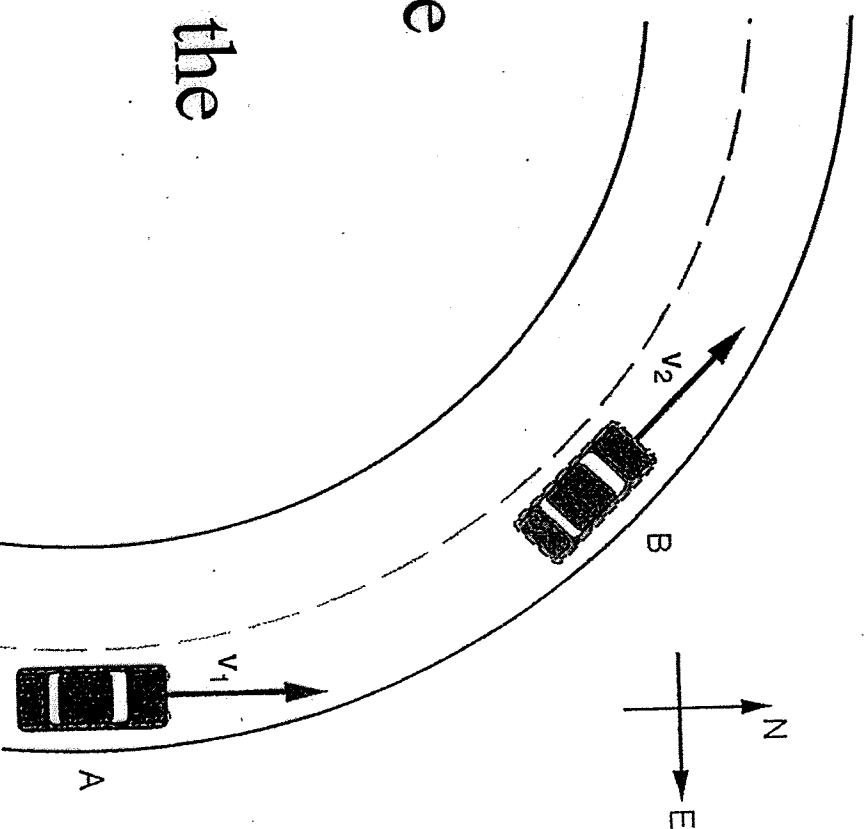
Interactive Question

Which of the following is true?

A) The instantaneous speed will always equal the magnitude of the instantaneous velocity.

B) The average speed will always equal the magnitude of the average velocity.

C) The instantaneous speed can never equal the magnitude of the instantaneous velocity.

D) The average speed can never equal the magnitude of the average velocity.

Interactive Question

In which of the following cases is the acceleration zero?

A) a car increases its speed from 0 mph to 30 mph

B) a car decreases its speed from 15 mph to 5 mph

C) a car goes around a curve at a speed of 30 mph

D) a car backs out of a drive at 10 mph

E) None of the above

Problem: A car starts from rest and accelerates to a velocity of 20 m/s due east in a time of 5 s. What was the magnitude and direction of the average acceleration of the car?

Given: $v_i = 0$ m/s
       $v_f = 20$ m/s
       $t = 5s$

Want: a

$$a = \frac{v_f - v_i}{t} = \frac{20 m/s - 0 m/s}{5s} = \boxed{4 \, m/s^2}$$

$$\underline{East}$$

Problem: You are driving 35 mi/hr in the positive x direction when a dog runs across your path. You slam on your brakes and in 2.0 seconds slow to 10 mi/hr. What was your average acceleration in m/s^2?

Given:

$$v_i = \left(35\,\frac{mi}{hr}\right)\left(\frac{1609\,m}{mi}\right)\left(\frac{1\,hr}{3600\,s}\right) = 15.6\,m/s$$

$$v_f = \left(10\,\frac{mi}{hr}\right)\left(\frac{1609\,m}{mi}\right)\left(\frac{1\,hr}{3600\,s}\right) = 4.4\,m/s$$

$$t = 2s$$

$$a = \frac{v_f - v_i}{t} = \frac{4.4\,m/s - 15.6\,m/s}{2s}$$

$$\boxed{a = -5.6\,m/s^2}$$