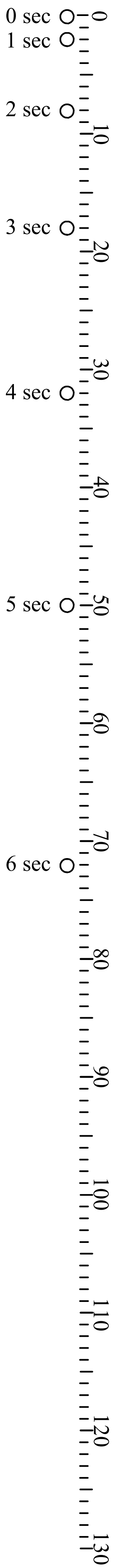
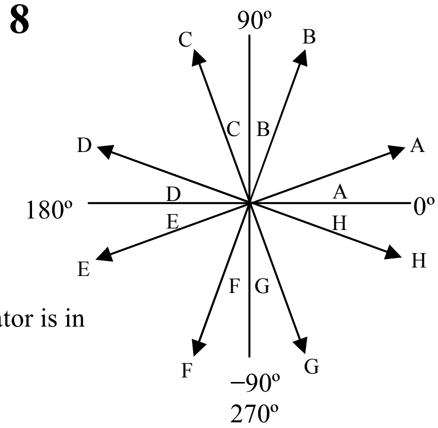
Due Tues., Sept 6

2011 PreAP Linear Motion 8

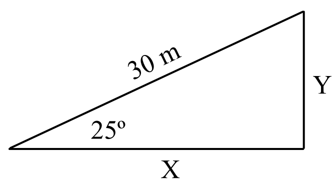




To make things easier, we will always measure our angles from the + x— axis. OR— 0° will be to the right.

1. Give the correct direction for the following. Each letter's angle is 10°.

A. * Arrow A = C. Arrow D = E. Arrow F =
B. * Arrow B = D. * Arrow E = F. Arrow G =



2. * Being sure that your calculator is in degrees, calculate x and y.

3. Let's learn a little more about acceleration. At the left you see the first six positions of an object that is accelerating. The circles show the object's position each second.

t	x	v
0		
1		
2		
3		
4		
5		
6		
7		
8		

A. Fill in the positions in the data table for the first 6 seconds.

B. * Where is the object after one second?

C. * Where is the object after four seconds?
Notice that you can't just multiply the first position by 4. Why? Knowing the velocities would help, so we need to do some calculations.

D. * You have its position after 4 seconds. Use a kinematic equation to calculate its acceleration.

Remember that acceleration has the units of m/s^2, which means how many m/s of velocity it gains each second.

E. * What is its velocity after 1 second?

F. * What is its velocity after 2 seconds?
Fill in the chart, all the way to 8 seconds.

G. * So, after 1 second the object is moving 4 m/s and would move ____ in that one second.

H. * And after 4 seconds it is moving 16 m/s and would move _____ in that one second.
And yet this is not entirely true, either, because the object speeds up during each second.

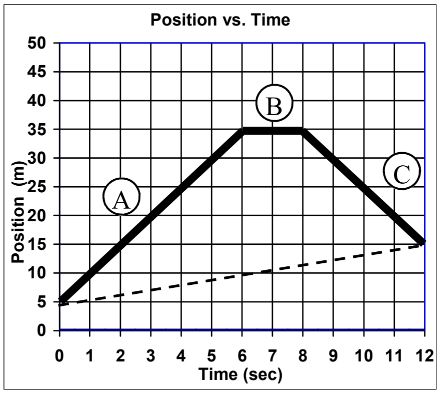
I. * Just to reinforce: the first half of the four seconds the object moves ____ m. In the second half of the first four seconds the object moves ____ m, which is ____ times as far as during the first half.

J. Use a kinematic equation to calculate the object's positions at 7 and 8 seconds.

Remember you HAVE TO use a kinematic equation when there is an acceleration. ALWAYS!

4. Sitting on the dock of the bay, wasting time and then my sister pushes me off the dock and into the water, 4.5 meters below (*tall dock*).
   A. Since I was sitting on the dock, what is my initial velocity?
   B. * What is my displacement?
   C. * How long does it take for me to do a face plant in the water?

5. An object is thrown into the air going 15 m/s. You want to know how high up it goes.
   A. Is its displacement going to be + or −?
   B. What will be its final velocity at the very top?
   C. * How high does it go?



6. Calculate the velocity of the object during line segment A.

We showed you that average velocity = Δx/Δt, where Δx is the displacement. Graphically, this is slope, also. Notice the dashed line on the graph, which represents the average velocity of the object for the first 12 seconds.

7. * What is the average velocity for the object for the entire 12 seconds of the graph?

1A) 10° 1B) 80° (or 90°−10°) 1D) 190° 2) x = 27.2 m

3B) 2 m 3C) 32 m 3D) 4 m/s^2 3E) 4 m/s 3F) 8 m/s 3G) 4 m

3H) 16 m 3I) 8 m; 32−8=24 m, 3 times as far. 4B) −4.5 m 4C) 0.96 sec

5C) 11.5m 7) 10/12 = 0.83 m/s

