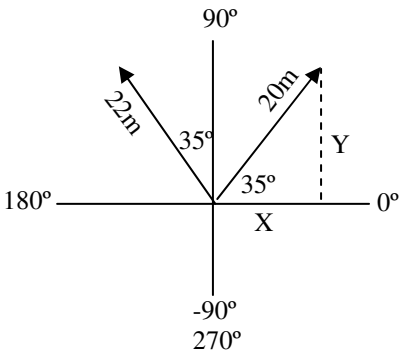
Due Thurs., Sept 8

2011 PreAP Linear Motion 10



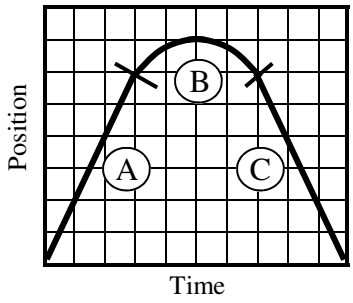
1. * Use the 20m long arrow to answer the following. We start by drawing a vertical line from the tip of the arrow to the x-axis to create a right triangle. Find the x and y components of the 20 m long arrow (*find x and y if 20 m is the hypotenuse*).

2. * A. Remembering that all angles need to be measured from the positive x-axis, what is the correct direction for the 22 m arrow?
   * B. Use this angle to calculate the x and y components, using the same equations that you used in Q1.

3. * A 2 kg rock is tossed straight up into the air. It goes 12 m. How fast was it thrown? (*You have enough info. Your freefall notes can help.)*

4. * A 45 kg soapbox car starts at rest and rolls 85 m downhill in 6.4 seconds. What is the soapbox car's acceleration?

Graph I Position vs. Time

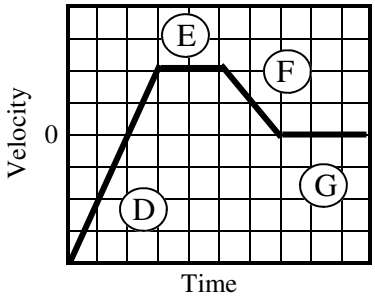


5. Use the two graphs at the left to answer the following. Notice that graph II is a velocity vs time graph. Which segment shows? (*There can be more than one answer.*)

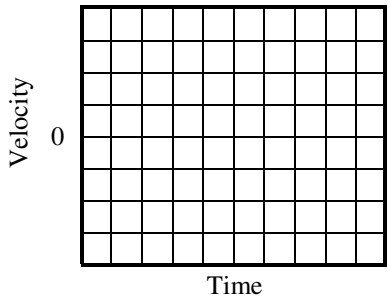
   A) at rest?
   B) + Δv?
   C) − Δx?
   D) + v?
   E) − v?
   F) Δx = 0?
   G) + a?
   H) − a?

6. Translate Graph I to the velocity and acceleration graphs below.

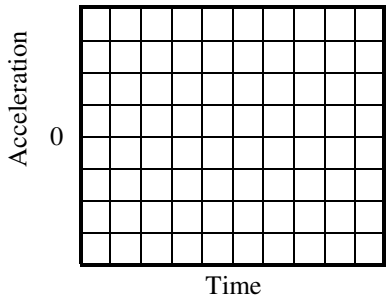
Graph II Velocity vs. Time

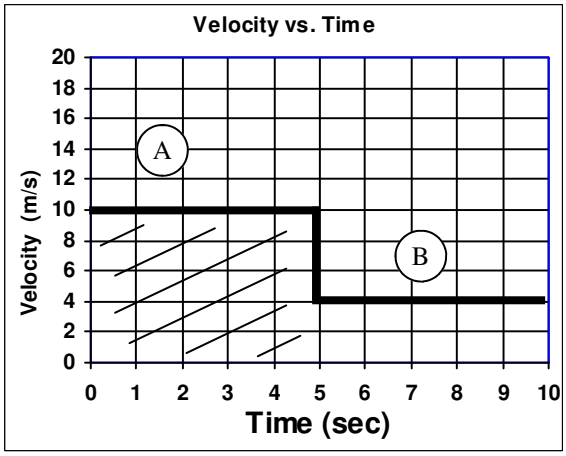


Velocity vs. Time



Acceleration vs. Time





7. Let's learn about transferring graphs backwards.

   A. For segment A, calculate how far the object must have travelled in the first 5 seconds. (*You have speed.*)

   B. Calculate the area of the shaded rectangle under line (L×W)

   Hmmmm. So, area = displacement.

   C. Find the displacement of the object during line segment B's time (*you now have 2 ways*).

1A) $y = 20\sin35° = 11.5$ m find x on your own.
2A) θ is greater than 90°, so $\theta = 90° + 35° = 125°$
2B) $y = 22\sin125° = 18$ m, find x.
3) Did you see that Vf = 0 m/s (at the top)? Use the $V_f^2 = V_i^2$ … formula to get Vi = 15.3 m/s
4) $a = 4.15$ m/s^2