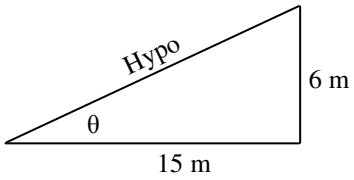
Due Thurs., Sept 13

2012 PreAP Linear Motion 11

You already know that sin30° = 0.5 (if you are in degrees). Let's learn inverse functions. Sin^{-1} is inverse sin. You push "Inv" or "2nd" and sin. Try it by putting in $Sin^{-1}(0.5)$ and you should get "30".

1. Given the following, find θ. A. * Sinθ = 0.8660; θ = B. * Tanθ = 4/5; θ = C. Tanθ = 6/8; θ = _____



2. * A. Calculate the length of the hypotenuse.

   * B. Calculate the angle (do not use the hypo for this):

3. An object accelerates at 6 m/s^2 for 3 seconds. During this time it travels 40 m **to the right**.
   A. Since the object moves to the right is the displacement + or −?
   B. Solve for the initial velocity of the object. (*Use the kinematic equations. Show variables and equation.)*
   Variables: Equation:
   Solve:

4. * An object is moving 30 m/s **to the right**. After 5 seconds it is moving 10 m/s **to the left**. Find the acceleration of the object.
   Variables: Equation:
   Solve:

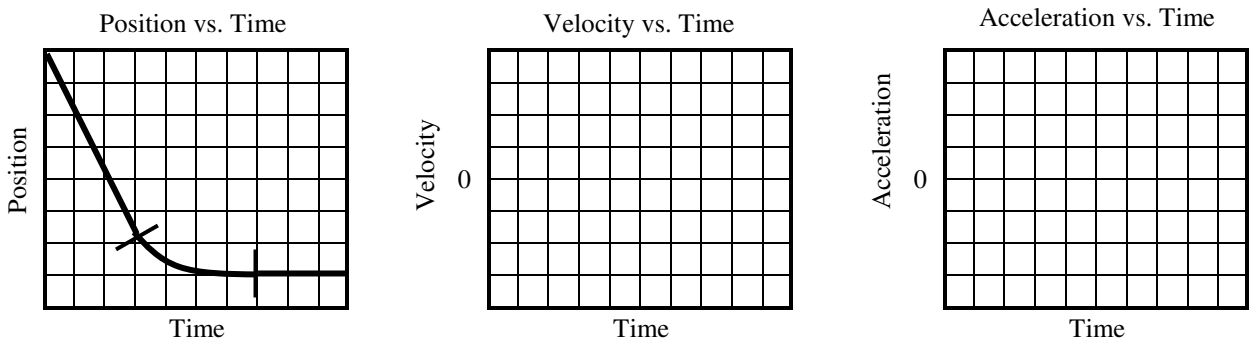
5. A ball is thrown 35 m/s into the air. How far up does it go? (*Use the "Freefall" notes if you need help.*)
   * Variables: Equation:
   * Solve:

6. An object moves 4.5 m/s for 6 seconds **without accelerating**. How far did it move in that time?
   * Variables: Equation:
   * Solve:

7. +, −, or 0?

   A. __ Velocity when moving to the right.
   B. __ Acceleration if moving left and slowing down
   C. __ Acceleration if moving to the right an speeding up.
   D. ___ Velocity if falling.
   E. ___ Acceleration if the speed doesn't change.
   F. ___ Velocity if the position doesn't change.
   G. ___ Horizontal position if to the right of the origin.
   H. ___ Displacement if moving to the left.

8. Let me talk you thru transferring the following graphs. For these simple graphs, you can treat each square as 1 m and 1 second. (*OMG—you can count squares. AHHHHH!!!!)*



A. You can see that the middle part of the position graph is curved, so calculating the slope is impossible, so we skip that part. Instead, we calculate the slope of the straight parts (the first and last line segments) and transfer them to the velocity graph. (*Calculate on the actual graph. Notice where 0 is on the velocity graph.)*

B. On the velocity graph, simply connect the two lines. The connecting line will be straight and have a positive slope.

C. Now find the slope of each of the three line segments on the velocity graph and transfer them to the acceleration graph.

Let's see if your graphs make sense. From the position graph you can see that the object starts with a negative velocity and ends up not moving (v = 0). So, the object's speed became LESS NEGATIVE, which we know is the same as MORE POSITIVE.

D. So did the object experience a + or − acceleration?

1A) 60° 1B) 38.7° 2A) 16.2 m (pyth theorem) 2B) 21.8°
3) 4.33 m/s 4) remember that Vf is neg (moving left), so a = −8 m/s^2
5) 62.5 m (remember that Vf = 0 m/s and a = −9.8 m/s^2 6) 27 m