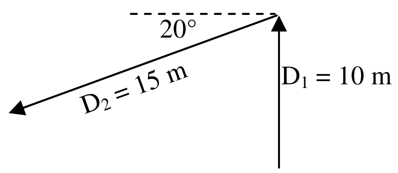
Due Fri, Sept 28

2012 PreAP Two Dimensions 6

1. Add the following two displacement vectors. (One more walk thru.)



A. The first vector (D_1) does not have a direction given. What is its direction?

B. (For vector 2) from the end (pointed side) of the arrow, draw a vertical dashed line to the x-axis (above or below).

C. From the start (non-pointed side) of the arrow, draw a horizontal line until it intersects with the vertical line you just drew. *You now have its components.*

D. What direction will you use for vector 2 (D_2)?

E. Using the correct directions, calculate the x and y components of each triangle.

$x_1 =$ $y_1 =$

*$x_2 =$ $y_2 =$

F. Calculate the total vertical and horizontal displacements.

$x_{total} =$ $y_{total} =$

G. Draw R in the space at the left, using total x and total y.

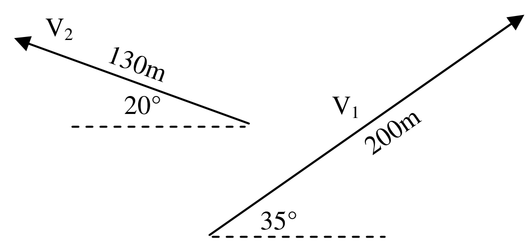
H. Calculate the resultant displacement's magnitude (hypo) and direction (θ), being sure to do a quadrant check at the end.

* Magnitude = * θ =

2. Add the two vectors shown at the right. Being sure that all angles start at the +x axis and keeping track of negatives.

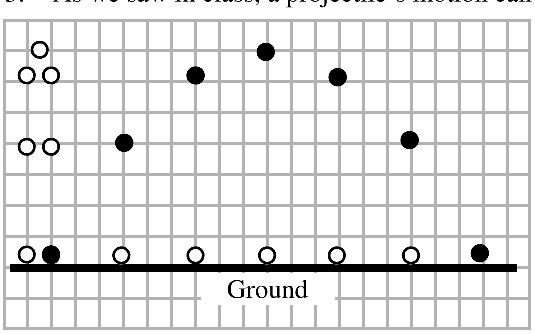
A. Below, add them graphically just like "Crazy and Lazy".

B. <u>Follow the EXACT METHOD as Q1</u>. For convenience I gave you a chart to organize your information. Fill it in as you go.



	Magni-tude	Direction	X-comp	Y-comp
V_1	200 m	* 35°		
V_2	130 m	* 160°		
		Totals		
R		* Magn.	164.5 m	
		* Direction	75.3°	

3. As we saw in class, a projectile's motion can be broken up into its x and y components. From the graphic:



A. * What is its y-direction acceleration?

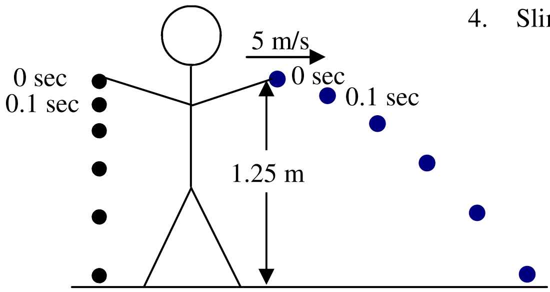
B. What is its y-velocity at the very top?

C. * What is its x-direction acceleration?

D. * So, what equation can we use in the x-direction?

E. If its initial x–velocity = 3 m/s, what is its final x–velocity?

F. If the ball is in the air for 1.5 seconds, how far away from its launch point does it land?



4. Slim Jim is here again to help us learn some physics. Thanks again, Jim! Slim Jim drops a ball at the same time he throws a ball to the right. The thrown ball is thrown exactly horizontal at 5 m/s. Each dot shows 0.1

   A. * How long does it take for the dropped ball to hit the ground?

   B. * How long does it take for the thrown ball to hit the ground?

   C. What is the same for the two balls?

   D. So what is ALWAYS the same for the x and y directions of a projectile?

   E. What is the initial velocity of the dropped ball?

   F. What is the initial y-velocity of the thrown ball?

   G. How far does the thrown ball land away from where it was thrown?

1E) $x^2 = -14.1$ m (did you use 200°?)
1H) 14.9 m at 161°

2) V1 direction is 35°. V2 direction is 160°.
   Resultant = 164.5 m at 75.3°.
3) A) -9.8 m/s^2 C) 0 m/s^2 D) S = D/T
4) A) 0.5 sec B) 0.5 sec

