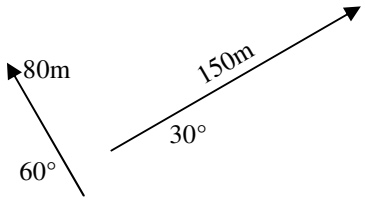
Due Thurs, Sept 22

2011 PreAP Two Dimensions 5

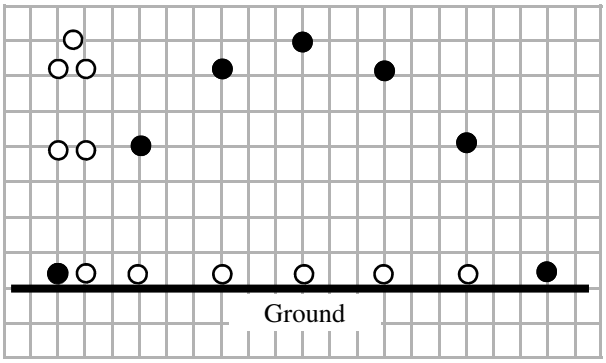
1. Give the correct magnitude and directions, given the following x and y totals.
   A. * $x_{total} = 12$ m $y_{total} = -6$ m $R_{mag} =$ $R_{direction}\ (\theta) =$
   B. * $x_{total} = -8$ m $y_{total} = -6$ m $R_{mag} =$ $R_{direction}\ (\theta) =$
   C. * $x_{total} = 18$ m $y_{total} = 5$ m $R_{mag} =$ $R_{direction}\ (\theta) =$
   D. $x_{total} = -7$ m $y_{total} = 16$ m $R_{mag} =$ $R_{direction}\ (\theta) =$

Now, using the "Adding Vectors" notes:

2. Add these vectors together, being sure that all angles start at the +x axis and keeping track of negatives.
   A. At the bottom right, add them graphically (You have two paths. Redraw like "Crazy and Lazy").
   B. * Fill in the chart and find the resultant's mag and direction..

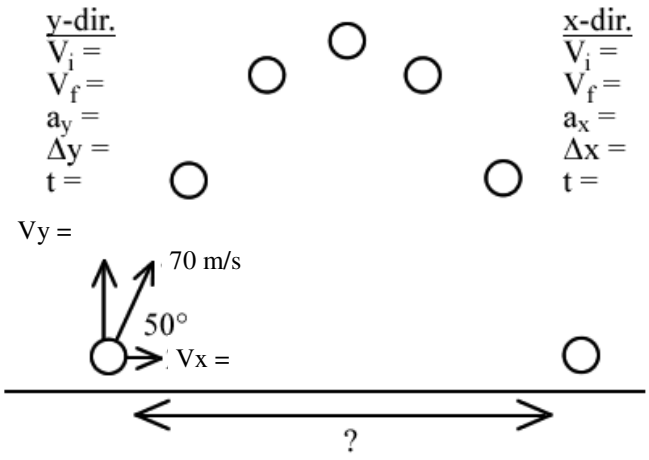


	Magni-tude	Direction	X-comp	Y-comp
V_1	80 m	*		
V_2	150 m	30°		
		Totals		
	R	Magn.		
		Direction		



3. As we saw in class, a projectile's motion can be broken up into its x and y components. From the graphic at the left:
   A. * What is its y-direction acceleration?
   B. * What is its x-direction acceleration?
   C. * So, what equation can we use in the x-direction?
   D. If its initial x–velocity = 3 m/s, what is its final x–velocity?
   E. What is its y-velocity at the very top?
   F. What variable will be the same for both the x and y directions?

4. * A projectile is launched 70 m/s at an angle of 50°. It is shot from the ground, to the ground.



   A. * You have the velocity and its angle, calculate the Vx and Vy (and label them on the diagram). These are initial vel.
   B. * What is its y-direction acceleration? (*Label*)
   C. * What is a_x?
   D. Since it is launched from the ground and lands back on the ground, what is Δy?
   E. * What is Vf in the y-direction?
   F. Calculate the time in the y-direction.
   G. Since it has no x acceleration and you have time, calculate the distance it lands away from its launch position (*which is known as its range*).

1) using $\tan^{-1}(y/x)$
1A) mag = 13.4m $\theta = -26.6°$ (4th Q)
1B) mag = 10 m $\theta = 36.9 + 180 = 216.9°$ (3rd Q)
1C) $\theta = 15.5°$
2) Direction for $V_1 = 120°$ R = 170 m $\theta = 58.1°$
3A) $-9.8\ m/s^2$ 3B) $0\ m/s^2$ C) S = D/T
4A) Vx = 45 m/s Vy = 53.6 m/s
4B) $a_y = -9.8\ m/s^2$ 4C) $0\ m/s^2$
4E) $Vy_{final} = -53.6$ m/s