

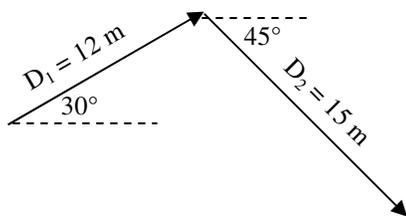
2012 PreAP Two Dimensions 5

1. Just to be sure you understand the notation: $-3B$ means “Go the negative direction of B three times OR go 3 times the length of B in the opposite direction of B.” Let’s use $B = 35\text{ m}$ at 110° .
- A. What quadrant does B point to?
 B. What quadrant does $-B$ point to?
 C. How far is $3B$?
 D. * What is $-3B$?

2. Give the correct magnitude and directions, given the following x and y totals. Be sure to do a quadrant check.

- A. * $x_{\text{total}} = 12\text{ m}$ $y_{\text{total}} = -6\text{ m}$ $R_{\text{mag}} =$ $R_{\text{direction}} (\theta) =$
 B. * $x_{\text{total}} = -8\text{ m}$ $y_{\text{total}} = -6\text{ m}$ $R_{\text{mag}} =$ $R_{\text{direction}} (\theta) =$
 C. * $x_{\text{total}} = 18\text{ m}$ $y_{\text{total}} = 5\text{ m}$ $R_{\text{mag}} =$ $R_{\text{direction}} (\theta) =$
 D. $x_{\text{total}} = -7\text{ m}$ $y_{\text{total}} = 16\text{ m}$ $R_{\text{mag}} =$ $R_{\text{direction}} (\theta) =$

3. Add the following two displacement vectors.



Let’s start by drawing the components, so you can see what you are calculating.

- A. From the end (pointed side) of each arrow, draw a vertical dashed line to the x-axis (above or below).
 B. From the start (non-pointed side) of each arrow, draw a horizontal line until it intersects with the vertical line you just drew.
You should now have two right triangles.
 C. Using the correct directions, calculate the x and y components of each triangle.

$x_1 =$ $y_1 =$
 $x_2 =$ $*y_2 =$

D. Calculate the total vertical and horizontal displacements.

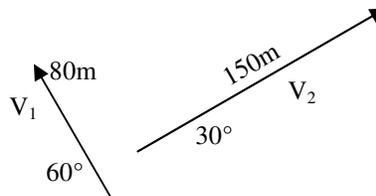
$x_{\text{total}} =$ $y_{\text{total}} =$

- E. Draw R in the space at the left, using total x and total y.
 F. Calculate the resultant displacement’s magnitude (hypo) and direction (θ), being sure to do a quadrant check at the end.

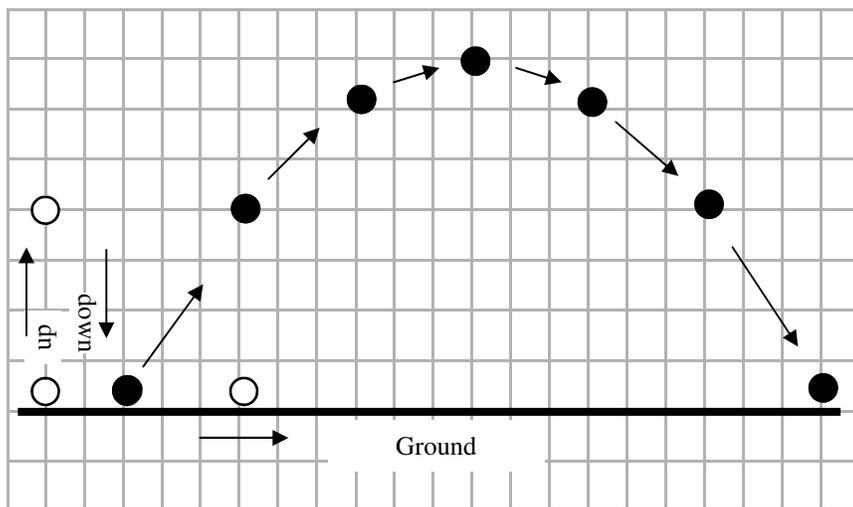
Magnitude = $\theta =$

4. 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 (You have two paths. Redraw them like “Crazy and Lazy”).
 B. Follow the EXACT METHOD as Q3. 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	80 m	*		
V_2	150 m	30°		
		Totals		
	R	Magn.		
		Direction		



5. The diagram shows a projectile shot from the ground to the ground. Let's break down the motion into its x and y positions.
- Below each of the black circles, draw an open circle showing where the object's x position. The first one is done for you.
 - On the left side of the diagram draw the vertical positions of the object for each moment. To make it more obvious, draw the up positions on first line and the down positions on the second. The first one is shown for you.

- What do you notice about the x-direction positions?
- what does it look like that we've have done before?
- What do you notice about the y-direction positions?
- Again, what does it look like that we've done before?

1D) 105m at 290°

2A) mag = 13.4m $\theta = -26.6^\circ$ (4th Q)

2B) mag = 10 m $\theta = 36.9 + 180 = 216.9^\circ$ (3rd Q)

2C) $\theta = 15.5^\circ$

3C) $y_2 = -10.6$ m (did you use -45 degrees?)

4) Direction for $V_1 = 120^\circ$ $R = 170$ m $\theta = 58.1^\circ$

4E) $V_{y_{\text{final}}} = -53.6$ m/s