2011 PreAP Two Dimensions 4

1. * If A = 22 at 215°, then −3A =
2. * If B = 18 at 112°, then −5B =
3. If C = 21 at 312°, then −2C =
4. If D = 21 at 65°, then −6D =

5. * A person walks 25 m west, then 18 m south. What is their total displacement? (*Vectors **always** includes magnitude and direction; and double check your quadrant.*)

6. * A person walks 5 m east, then 10 m south, then 12 m west, then 3 m north. After calculating x_{total} and y_{total}, calculate the person's total displacement. (*Always!*) (*And, again, double check your quadrant.)*

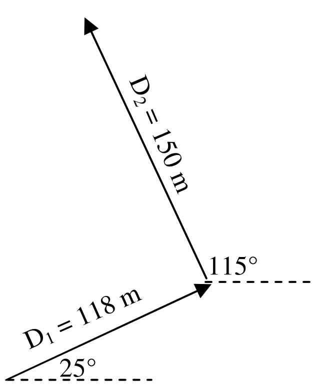
7. * A projectile is shot going 145 m/s at an angle of 35º, what is the projectile's initial x and y velocities? (*You have a vector with magnitude and direction. Calculate its x and y components.)*

8. * A polar bear walks 3.5 km/hr along the frozen ice at 85° for 3.2 hours.
   A. Calculate how far the polar bear walked.

   B. Now that you have a distance and an angle, calculate the polar bear's x and y displacement from its initial position.

9. A group of penguins is waddling 1.6 km/hr at 65° for 15 hours. Calculate how far they went in the x and y directions. (*Challenge: how long does it take to reach the polar bear?*)*

10. * Add the two vectors together shown below. (*Follow the "Adding Vector" notes exactly*).



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 straight down.

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. 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_{total} = y_{total} =

E. You now have the sides of a large right triangle made up of x_{total} and y_{total}, calculate the total displacement's magnitude (hypo) and direction (θ).

Q1 $-3A = 66$ at 35°. Q2. $-5B = 90$ at 292 Q5) 30.8 m at 215.8°. Has to be in the 3rd Q.
Q6) $x_{total} = -7$m $y_{total} = -7$m D = 9.9 m (hyp) $\theta = 225°$ (again, in the 3rd Q)
Q7) Vx is cos = 118.8 m/s Vy is sin = 83.2 m/s
Q8 D = (3.5 km/hr)3.2hr = 11.2 km at 85°. x = 11.2cos85° = .976 km
(so small because D is almost vertical); y = 11.2sin85° = 11.16 km.
(Q9 challenge: never. Penguins live at the s pole; polar bears in the north, except in Coke commercials.
Q10 $x_1 = 106.9$m $y_1 = 49.9$m; $x_2 = -63.4$m $y_2 = 136$m $x_{total} = 43.6$ m $y_{total} = 185.8$ m; Displacement total = 190.9 m at 76.8°.