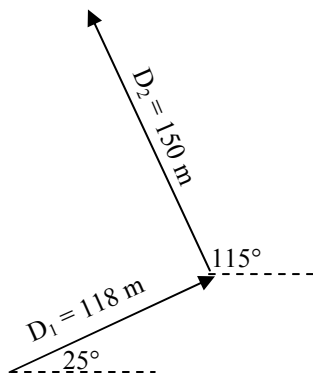


PreAP Two Dimensions 4

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 35° , 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.

$$x_1 = \qquad \qquad \qquad y_1 =$$

$$x_2 = \qquad \qquad \qquad y_2 =$$

- D. Calculate the total vertical and horizontal displacements.

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

- 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) $x_{\text{total}} = -7\text{m}$ $y_{\text{total}} = -7\text{m}$ $D = 9.9$ m (hyp) $\theta = 225^\circ$ (again, in the 3rd Q)

Q7) V_x is $\cos = 118.8$ m/s V_y is $\sin = 83.2$ m/s

Q8 $D = (3.5 \text{ km/hr})3.2\text{hr} = 11.2$ km at 85° . $x = 11.2\cos 85^\circ = .976$ km

(so small because D is almost vertical); $y = 11.2\sin 85^\circ = 11.16$ km.

(Q9 challenge: never. Penguins live at the s pole; polar bears in the north, except in Coke commercials.

Q10 $x_1 = 106.9\text{m}$ $y_1 = 49.9\text{m}$; $x_2 = -63.4\text{m}$ $y_2 = 136\text{m}$ $x_{\text{total}} = 43.6$ m $y_{\text{total}} = 185.8$ m; Displacement total = 190.9 m at 76.8° .