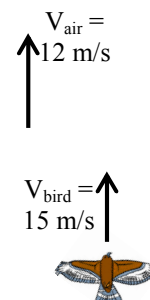
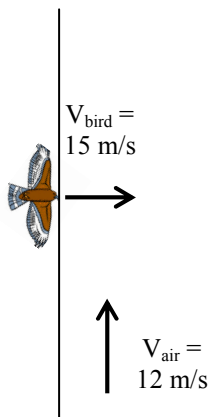


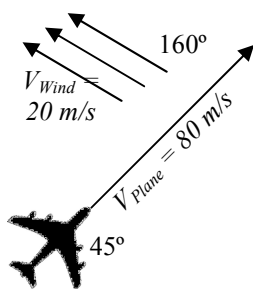
## PreAP Two Dimensions 10

- \*Given these vectors:  $A = 425 \text{ m at } 75^\circ$ ;  $B = 68 \text{ m at } 130^\circ$ ;  $C = 91 \text{ m at } 319^\circ$ ;  $D = 213 \text{ m at } 234^\circ$ . If  $R = A - 3B + 2C + D$ , Prepare these vectors for graphical adding. (*Do the multiplying and subtracting. See back key for help.*)
- Given these vectors:  $A = 125 \text{ m at } 125^\circ$ ;  $B = 48 \text{ m at } 330^\circ$ ;  $C = 100 \text{ m at } 28^\circ$ ;  $D = 210 \text{ m at } 212^\circ$ . If  $R = -2A + B - 3C + 2D$ , Give R in meters and degrees:  $R =$

- A bird has a velocity of 15 m/s in still (not moving) air. The bird enters a canyon that has an airstream with a velocity of 12 m/s north. (*Let me walk you thru this.*)
  - \* What is the velocity of the bird relative to the ground if the bird flies with the air?
  - \* What is the velocity of the bird relative to the ground if the bird flies against the air?
  - What if the bird enters the air stream moving directly east? (*Magnitude and direction, of course.*) (*You have two vectors at  $90^\circ$  to each other: add them together.*)

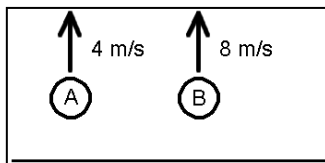


- \* If the canyon is 48 m wide, how long does it take the bird get across? (*Realize that this is just an x-direction question, so only use x-direction #s.*)
- How far up the canyon has the bird been pushed by the air? (*“..up the canyon” tells you that this is a y-direction question, so only use y-direction #s AND the x-direction time you just calculated.*)

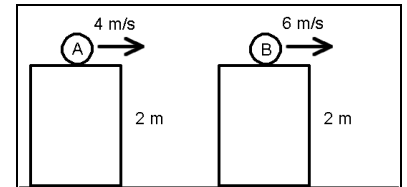


- A plane moving 80 m/s at  $45^\circ$  encounters a wind moving 20 m/s at  $160^\circ$ .
  - Is the x-direction of the wind blowing with the plane or against the plane?
  - So, is the plane's x-velocity faster or slower when in the wind?
  - Is the y-direction of the wind blowing with the plane or against the plane?
  - So, is the plane's y-velocity faster or slower when in the wind?
  - \* Realizing that this is just adding vectors, calculate the plane's total speed relative to the ground. (*Follow the “Adding Vector” notes exactly if you need help or you could use the table on TD5Q4 to keep organized.*)

- Jar Jar Binks is still trying to get away from the avid Star Wars fans. Ingenious that they are, they use surgical tubing to launch watermelons at there unfavorable character. If the watermelons are launched 20 m/s at an angle of  $35^\circ$ , how far away will the watermelon land?



6. Object A or B?  
 A. \_\_\_ Which has the greatest vertical acceleration?  
 B. \_\_\_ Which has the greater maximum height?



7. Object A or B?  
 A. \_\_\_ Hits the ground first?  
 B. \_\_\_ Has the greatest initial y-velocity?  
 C. \_\_\_ Has the greatest range (greatest  $\Delta x$ )?  
 D. \_\_\_ Has the greatest magnitude of velocity when it hits the ground (moving fastest)?

Q1:  $-3B = 204$  at  $310^\circ$ ;  $2C = 182$  at  $319^\circ$ . So,  $R = (425 \text{ m at } 75^\circ) + (204 \text{ at } 310^\circ) + (182 \text{ at } 319^\circ) + (213 \text{ m at } 234^\circ)$   
 3A) 27 m/s (they are flowing in the same direction)    3B) 3 m/s south or  $-3$  m/s (bird is faster than the air)  
 3D) 3.2 sec  
 4E) Just do sin and cos as always. Totals:  $V_x = 37.8$  m/s     $V_y = 63.4$  m/s. Find the mag and direction.