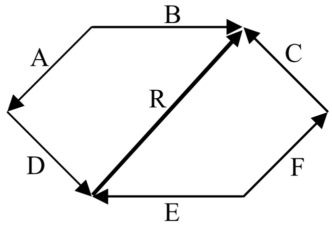
A-Day: Due Wed., 9/30 (Assigned: 9/19)
B-Day: Due Thurs., 9/24 (Assigned: 9/22)

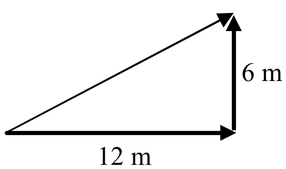
PreAP Two Dimensions 3



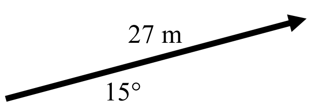
1. Give three combinations of vectors that would correctly produce R.

2. A hockey puck slides 3 m/s on the ice rink for 4 seconds. Find the vertical component of the hockey puck's velocity.

3. A car drives at 60°. The car is going 60 mph for 1.2 hours. Find how far it went in the x-direction.

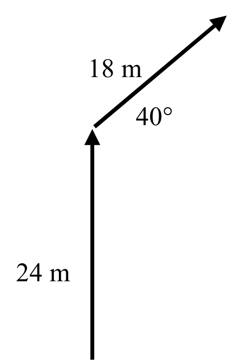


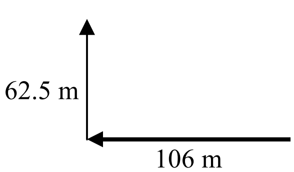
4. Calculate the hypotenuse and angle of the triangle at the left.



5. We will call the sides of an arrow are called the start and tip (pointy end).
   A. From the start of the arrow (opposite the point) draw a horizontal line to the right.
   B. From the point of the arrow draw a vertical line downward.
   C. Now you have the x an y components of the vector.
   Calculate the x and y components of the 27 m vector.

6. A person walks 24 m at 90°, then turns and walks 18 m at a direction of 40°. Calculate the person's total displacement and its direction.





7. A. Draw the resultant for the two vectors at the left.
   B. Make sure that each of the vectors is positive or negative.

   C. Find the magnitude and direction of the resultant.

   D. If 0° is toward the right and 90° is straight up, check the angle you found to be sure it is correct.

8. Person A walks 55 m at 38°. Then the person turns and walks 20 m north. A Person B starts at the same place as Person A. What direction and distance does Person B have to walk to walk straight to Person A's final position?

Remember: the magnitude of a vector is how long it is. Given 25 m/s at 15°, 25 m/s is the magnitude.

9. If two vectors have unequal magnitudes (A ≠ B), can their sum ever be zero?

10. If vector A is added to vector B, how is it possible for their sum to = exactly A + B?

11. Three vectors, A, B, and C, are added together head to tail and form a closed loop. What is the total displacement of the three vectors?

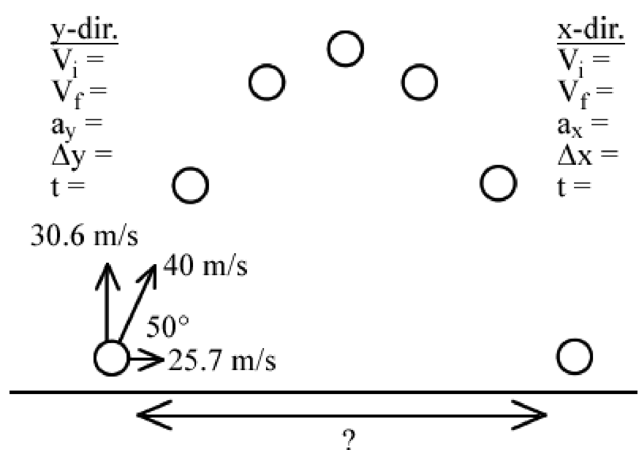
12. How can a vector have a component equal to zero, but not have a nonzero magnitude.

Now I need us to push a bit forward with Projectile Motion. The following is very basic.
Follow along and you should understand.

13. An object is shot from the ground to the ground, as seen on the diagram below. In the y-direction, a projectile is just free-fall. You know about objects being thrown from the ground and landing back on the ground. The diagram shows the initial x and y velocities.
    A. Fill in the y-direction variables below.
    B. Calculate how much time the object is in the air.

    In the x-direction, there is no acceleration OR $a_x = 0$ m/s^2. In the x-direction the object is at constant speed.
    C. What equation do we use for constant speed?

    D. Fill in the x-direction variables, realizing that the time is the same in both directions.
    E. Calculate how far the object moves in the x-direction.



14. An object is shot horizontally from a 7m tall ledge.
   A. Since it is shot horizontally, what is the object's initial y-velocity (Vyi)?
   Again the y-direction is just freefall.
   B. Fill in the y-variables on the diagram below.
   C. Calculate the time it takes for the object to fall to the ground in the y-direction.

   In the x-direction, it is at constant speed.
   D. Write the equation you will use in the x-direction.
   E. Using the time you found in the y-direction, calculate how far away it lands in the x-direction.

<u>y-dir.</u>
V_i =
V_f =
a_y =
Δy =
t =

<u>x-dir.</u>
V_i =
V_f =
a_x =
Δx =
t =