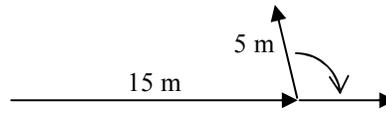


2009 Two Dimensions 6

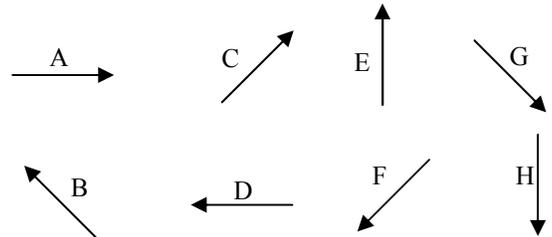
1. Projectile Motion?
 - A. Dropping a helium balloon
 - B. Throwing a ball horizontally.
 - C. Jumping off of a diving board.
 - C. Running on the ground.
2. A person walks 65 meters at an angle of 22° . How far east did they walk?

3. Notice the two vectors at the right. Keep the 15 m long vector alone at 0° (pointing to the right). Think about all of the ways you could turn the 5 m long vector when you add them together.



- A. What is the largest the resultant could possibly be?
(What is the greatest displacement from your starting position?)
- B. What is the shortest the resultant could possibly be?
(What is the shortest displacement from your starting position?)

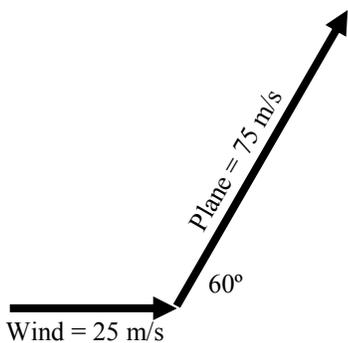
4. Use the notes "Vector Basics" and "Adding Vectors."
 - A. What do we mean by the magnitude of a vector?
 - B. What is resolving a vector?



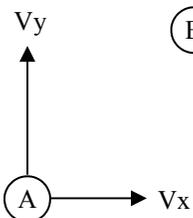
5. Graphically add these vectors: $E + B - 2D + G$.

6. Mathematically, what does $B + H + G = ?$

7. A plane is flying 75 m/s at a direction of 60° . It is pushed by a 25 m/s wind that is blowing directly east.
 - A. Does the wind increase or decrease the speed of the plane?
 - B. Does the wind have any vertical component?
 - C. Add the two vectors together to find the plane's total speed and direction in the wind.



8. The arrows show the magnitude (amount) of V_x and V_y at point A on the projectile's parabola.
 - A. As the projectile goes from A to C, does V_y increase or decrease?
 - B. Use arrows to show V_x and V_y at each letter. Arrows don't have to be the exact right size, just bigger or smaller.



(C)

(D)

(E)

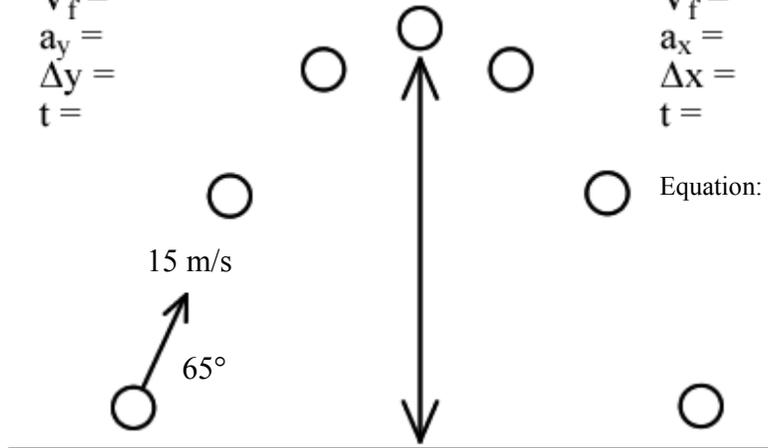
y-dir.

$V_i =$
 $V_f =$
 $a_y =$
 $\Delta y =$
 $t =$

x-dir.

$V_i =$
 $V_f =$
 $a_x =$
 $\Delta x =$
 $t =$

9. A ball is shot from the ground going 15 m/s at an angle of 65° . How high did it go?
- A. Find the x and y components of the initial velocity.
- B. Calculate how high it goes.



Equation:

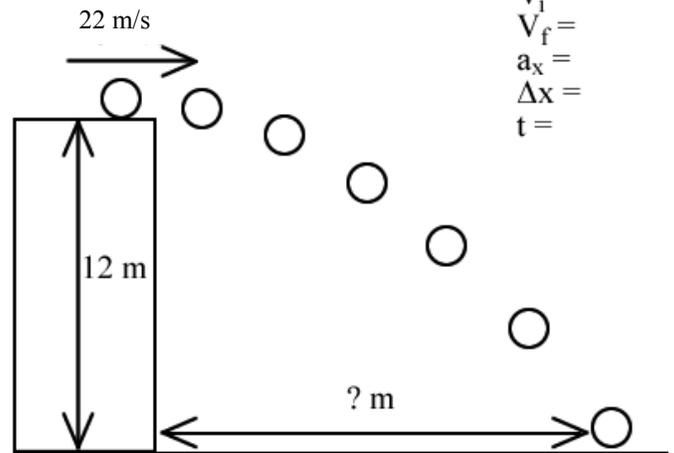
10. An object is shot horizontally going 22 m/s from the top of a 12 m ledge.
- A. Since it is shot horizontally, what is its initial y-velocity?
- B. Solve for how far away it lands.

y-dir.

$V_i =$
 $V_f =$
 $a_y =$
 $\Delta y =$
 $t =$

x-dir.

$V_i =$
 $V_f =$
 $a_x =$
 $\Delta x =$
 $t =$



11. A projectile is shot from the ground, to the ground.
- A. At what angle should it be shot to have the greatest range (to go the farthest)?
- B. Then it is shot at 40° , 60° , and 20° . Rank the three angles from farthest range to least range.