# 2008 Two Dimensions 8

1. What is a resultant?

2. Why do we break vectors into x and y components?

Use the "Relative Motion" notes to answer the following.

3. A person takes 18 seconds to walk from one side of a ship to the other, if the boat is not moving. When the boat IS moving, how long will it take the person to walk across the boat?

4. A woman is able to walk 3 m/s as shown on the diagram at the right. The moving walkway is moving 2 m/s.
   A. How fast is the woman moving relative to the walkway?
   B. How fast is the woman moving relative to the chair next to the walkway?
   C. How long would it take the woman to walk to the food court, 100 m away?

   D. If the woman turns around and walk the "wrong way" on the walkway, how fast is she moving relative to the chair?
   E. How long would it take her to walk the 100 m from the food court?
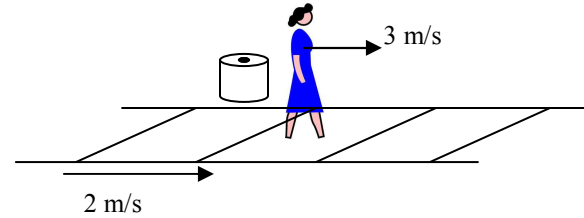
5. On the projectile's parabolic path at the right, its component velocities at B are given. Figure out which position the following diagrams are from OR put "N/A" if it belongs to none of the positions.
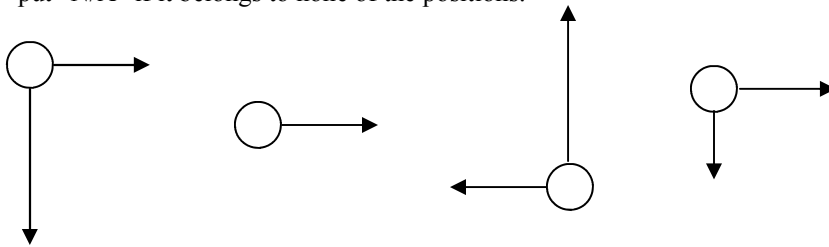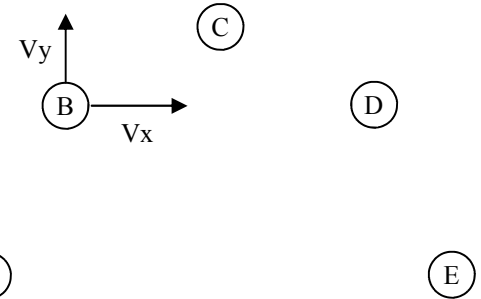
Following the directions on the "Adding Vector" notes:

6. A boat is moving 50 m/s at 50º. It experiences a current in the ocean of 36 m/s as shown.
   A. What direction do you have to use for the current?
   B. Find the actual direction and velocity of the boat.
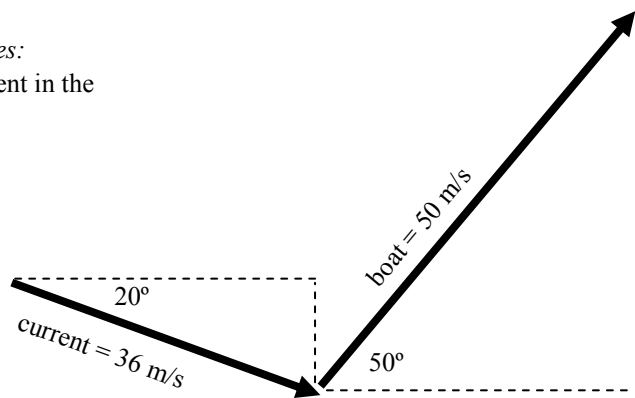
7. From the lab.
    A. How far is the distance between the photogates in meters?
    B. Times given for the ball thru the gates: 0.0214; 0.0220; 0.0218.
        Calculate the average time thru the gates.

        10 cm   *photogates*
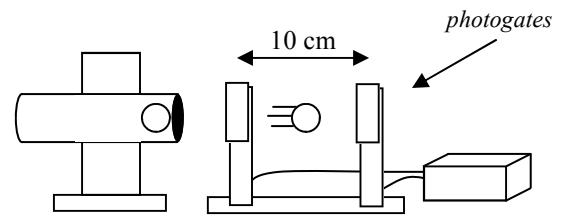
    C. Since you know the time thru the gates and the distance between
        the gates, calculate the average velocity of the ball thru the gates.

    D. Since it is launched horizontally, is this Vx or Vy (*label it*)?
        The height of the ball in the launcher is 1.172 meters above the floor.
    E. What is Δy for the ball? *(Be sure to ask yourself "does it rise or fall this distance?")* Δy = _____
    F. What is Vyi for a horizontally launched object?   Vyi = _____
    G. What is a_y for the object? a_y = _____
    H. How much time does it take for the ball to hit the ground? (*Use E-G to help you answer this.*)

    I. How far away will you have to put the target? (*Calculate range.*)

8. A projectile is shot at 30° going 24 m/s. How high up does the projectile go?
    A. Is this an x or y question?
    B. Find the velocity in that direction
        (*see the diagram at the right*).
    C. What two points on the projectile parabola is this?
    D. Write what you know about this situation (Vi, Vf, a, t, Δy)
        and solve for "how high".

        24m/s
        30°