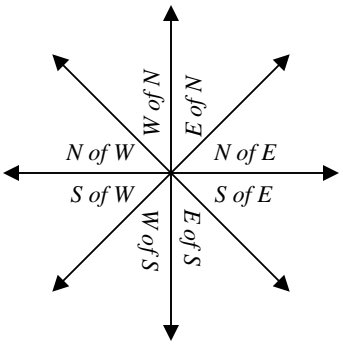
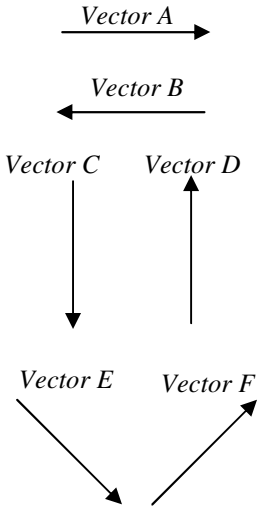
A-Day: due Thurs., 10/3 (Assigned 10/3)
B-Day: due Fri., 10/6 (Assigned 10/4)

Two Dimensional Motion 8



Hints on back. Try NOT to use them first. The more you use the hints, the less you actually know. Fight with the problems FIRST, then refer to them later.

1. Using the vectors at the side do this graphical vector addition: D + F –2A. (Draw the resultant, too.)



2. A plane is traveling at 42^{o} S of W at 85 m/s. A stiff wind blows due east at 25 m/s. Find the final speed and direction of the plane.

3. The final vector you drew above is called the r_____.

4. We _____ non-horizontal or vertical vectors into their _____.

5. I climb a ladder 2.3 m straight up into a tree. Find the horizontal component of this motion.

6. A baseball is thrown from the ground at 35^{o} and 7 m/s. Find how far away it lands (called its _____).

7. For the above baseball—find how high it went into the air (yep: that means "the top").

8. A projectile is launched at an angle of 35^{o} at 60 m/s. The cannon is on a 15 m ledge. Find how far away the projectile lands.

9. A fish is trying to escape from a pursuing sea lion (and example of _____). The fish is swimming 0.4 m/s when it begins to flee. It accelerates at 0.4 m/s^{2} at an angle of 60^{o} to the surface of the water (downward).
   A) After 3 seconds, to what depth did the sea lion have to dive?

   B) A boat is following a radio collar on the sea lion. How far will it have to travel to stay with the chase?

Homework Hints

1) Do it graphically. That means draw them. Be sure to draw the resultant. (see "Vector Basics" for help.)

2) Just add vectors. Remember to resolve vectors into x and y components for those vectors not already on the x or y axis. (#5 also relates to this.) (See "Adding Vectors")

6) Use the notes "Projectile Motion Example" if you need help. This is a basic projectile motion problem. You have to be able to do this for the test.

7) Use the information from #6, but remember what you know about a projectile at the top of its path. See "Freefall" notes.

8) In this example the projectile does not start and end on the ground. So $\Delta y \neq 0$. See the notes from class. What would you need to know to find t? Find THAT and t is easy to find and you are back to a regular projectile motion problem. (Struggle with that for a bit. Another hint is below.) Help on website in Teacher notes.

9) This is an example of the using the kinematic equations at an angle. Use the kinematic equations in the direction of the acceleration. Try it; struggle with it. Then (if you STILL don't get it) - additional hint below.

Additional Hints:

8) You need to find Vf before you can find t. $Vf \neq -Vi$ this time because it falls farther than it went up.

9) Hint 1: "Depth" is in the y-direction. But the fish is moving at an angle. You need to find the length of the hypotenuse (the fish) before you can find the depth of the sea lion (y-direction).

Hint 2: Ignore the angle. Pretend the fish is moving horizontally. Use what you are given to find Δx for the fish, using one of the kinematic equations. THEN, change this number to a hypotenuse at 60 degrees.