2D Rate Problems

1. A boat heads directly across a river that is 250m wide with a velocity of 12 m/s. If the river flows at 6.0 m/s find the distance downstream the boat will land
2. A plane intends to fly north with a speed of 250 m/s to an airport 500m away. There is a cross wind of 50 m/s blowing east that blows the plane off course. Find the distance the plane is blown east.
3. Imagine you swim east across a river 20 m wide at 4m/s. The current pushes you south downriver at 1m/s. How long will it take you to reach the other side? How far downriver will you reach the opposite bank?
4. You are driving a boat east across a river 100m wide with a downward current of 1.2m/s. You are trying to reach a dock 10m downriver from where you started. How fast must you go to land at the dock?
5. A pitcher can throw a ball at a velocity of 125 km/h straight ahead. Home plate is a distance of 60m straight in front of him. If he throws the ball straight when a cross-wind is blowing at 28 km/h to the left, how far to the left will the ball be when it should be crossing home plate?
6. A cyclist rides at 8m/s due north on the right hand shoulder of a road. A long gust of wind blows the cyclist at 1m/s to the left. How far north will the cyclist travel before she is blown off the road?
7. You are rowing a boat eastward across a river at 4m/s. The current pushed you downstream at a rate of 1.8m/s. If the river is 100m wide, how far downstream from where you started do you land?
8. A skywriter a distance of 200km S and 100km W of central park takes flight in sustained winds of 10km E. How fast must he fly due north to use the wind to push him directly over central park?
9. You are rowing a boat at 5m/s across a river that is 600m wide. You reach land on the other side 25m downstream from where you started. What is the current of the river?
10. You are flying a plane at 70m/s due east. You fly for 4900m east when you suddenly notice you are 140m north of where you intended to be. What is the velocity of the wind that is affecting your flight path?
11. You are a racecar driver racing your car due west at 100m/s across the Sahara desert (3x109 m wide). You end up 2x105 m south of where you intended. What was the velocity of the sustained wind you encountered?
12. In a triathlon, a swimmer swims straight across a river 330m wide at 2m/s. When she gets out of the water, she is astonished to find that she is 50m downstream of where she started. What was the current of the river?

Vector Review

Find the magnitude and direction of the following vectors:

-4

Find the component form of the following vectors (in form):

17˚

32

55

63˚

37˚

7

Using vectors , & above, solve the following:

+ +)