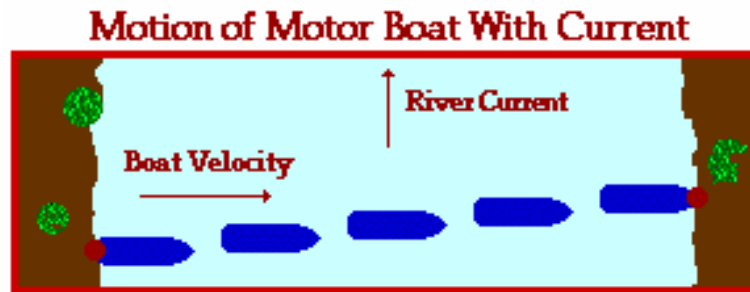


- If a motor boat were to head straight across a river (that is, if the boat were to point its bow straight towards the other side), it would not reach the shore directly across from its starting point.
- The river current influences the motion of the boat and carries it downstream.
- The motor boat may be moving with a velocity of 4 m/s directly across the river, yet the resultant velocity of the boat will be greater than 4 m/s and at an angle in the downstream direction.
- While the speedometer of the boat may read 4 m/s, its speed with respect to an observer on the shore will be greater than 4 m/s.



Question: A motor boat traveling 4 m/s, East encounters a current traveling 3.0 m/s, North.

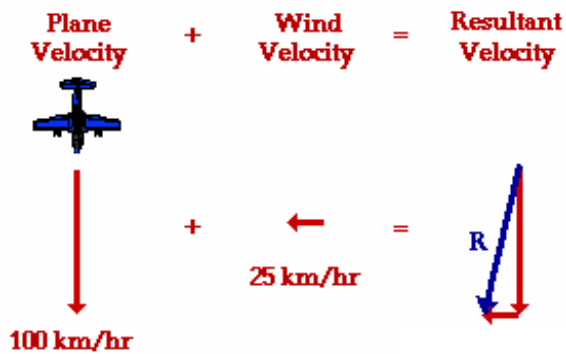
- a. What is the resultant velocity of the motor boat?
- b. If the width of the river is 80 meters wide, then how much time does it take the boat to travel shore to shore?
- c. What distance downstream does the boat reach the opposite shore?

Practice problem: A motor boat traveling 5 m/s, East encounters a current traveling 2.5 m/s, North.

- What is the resultant velocity of the motor boat?
- If the width of the river is 80 meters wide, then how much time does it take the boat to travel shore to shore?
- What distance downstream does the boat reach the opposite shore?

The Plane

Question: Consider a plane traveling with a velocity of 100 km/hr, South which encounters a side wind of 25 km/hr, West. Now what would the resulting velocity of the plane be?



Directions: Solve the following vectors problems algebraically

Practice Problems

1. A motor boat traveling 5 m/s, East encounters a current traveling 2.5 m/s, South.

- a. What is the resultant velocity of the motor boat?

- b. If the width of the river is 80 meters wide, then how much time does it take the boat to travel shore to shore?

- c. What distance downstream does the boat reach the opposite shore?

2. A car moving east at 45 km/hr turns and travels west at 30 km/hr. What are the magnitude and direction of the resultant velocity?

3. You are riding in a bus moving slowly through heavy traffic at 2.0 m/s. You hurry to the front of the bus at 4.0 m/s relative to the bus. What is your speed relative to the street?

4. A motorboat heads due east at 11 m/s relative to the water across a river that flows due north at 5.0 m/s. What is the velocity of the motorboat with respect to the shore?

5. A boat is rowed directly upriver at a speed of 2.5 m/s relative to the water. Viewers on the shore find that it is moving at only 0.5 m/s relative to the shore. What is the speed of the river? Is it moving with or against the boat?

6. Consider a plane traveling with a velocity of 100 km/hr, South which encounters a side wind of 25 km/hr, West. Now what would the resulting velocity of the plane be?

7. A passenger plane is traveling at a velocity of 100 km/hr with respect to the air and encounters a tailwind with a velocity of 25 km/hr, what is the velocity of the plane relative to an observer on the ground below?

