

Section 3.3: Relative Velocities in Two Dimensions

- A man attempts to swim at 6.5 m/s due west across a river which flows south with a 2.4 m/s current.

 - What will be his resultant velocity?
 - How long does it take him to cross the river, if the river is 1500 m wide?
 - How far down stream does he land?
- A canoeist can paddle her canoe at a speed of 4.5 m/s in still water. A river that the canoeist wishes to cross flows south at 1.7 m/s.

 - If the canoeist leaves the west bank of the river in an attempt to cross the river, what will be the canoeist resultant velocity?
 - How long does it take her to cross the river, if the river is 2575 m wide?
 - How far down stream does she land?
- A canoe paddler attempts to row across a river. He paddles at a rate of 0.80 m/s [S] directly across the river but the current pushes him downstream at a rate of 0.45 m/s [W].

 - What is the velocity of the canoeist relative to the bank of the river?
 - If the river is 295 m wide how far downstream is the canoeist when he reaches the opposite bank?
 - How far down stream does he land?
- Dianne rows a boat at 8.0 m/s [N] directly across a river that flows 5.0 m/s [E].

 - What is her resultant velocity?
 - If the river is 240 m wide, how long will it take Dianne to row across the river?
 - How far down stream will Dianne be?
- The current in a river is traveling southward at 3.1 m/s. A barge in the current is traveling northwards at a speed of 5.2 m/s relative to the water. The skipper on the barge is traveling west, relative to the barge, at 2.2 m/s. Find the velocity of the skipper relative to the earth.
- The current in a river moves at 4.0 m/s [S]. How fast and in what direction must a swimmer move through the water in order to have a resultant velocity relative to the river bank of 5.6 m/s [E]?
- A rowboat is able to move at 1.50 m/s in still water. It is pointed directly east. The current in the river is moving at 0.75 m/s, due South and is carrying the boat off course.

 - Calculate the velocity of the rowboat relative to the Earth.
 - If the river is 250 m long, how long will it take to cross the river?
 - How far downstream will the rowboat land?
- Suppose that the rower in the boat in the previous question wished to actually move the boat directly East.

 - In what direction would she have to aim the boat to compensate for the current?
 - What would be her resultant velocity?
 - How long would it take to cross the river?
- John, who can row a boat in still water at 5.0 m/s, wishes to cross a 8.00×10^2 m wide river that runs south at 2.5 m/s.

 - If he gets directly across the river (East), what will be his resultant velocity?
 - In which direction did he have to aim his boat?
 - How long did it take him to cross the river?
- A canoeist can paddle her canoe at a speed of 4.5 m/s in still water. A river that the canoeist wishes to cross flows south at 1.7 m/s.

 - In what direction must the canoeist paddle in order that she will land directly across the river? (East)
 - What is her resultant velocity?
 - How long will it take her to cross the river?

