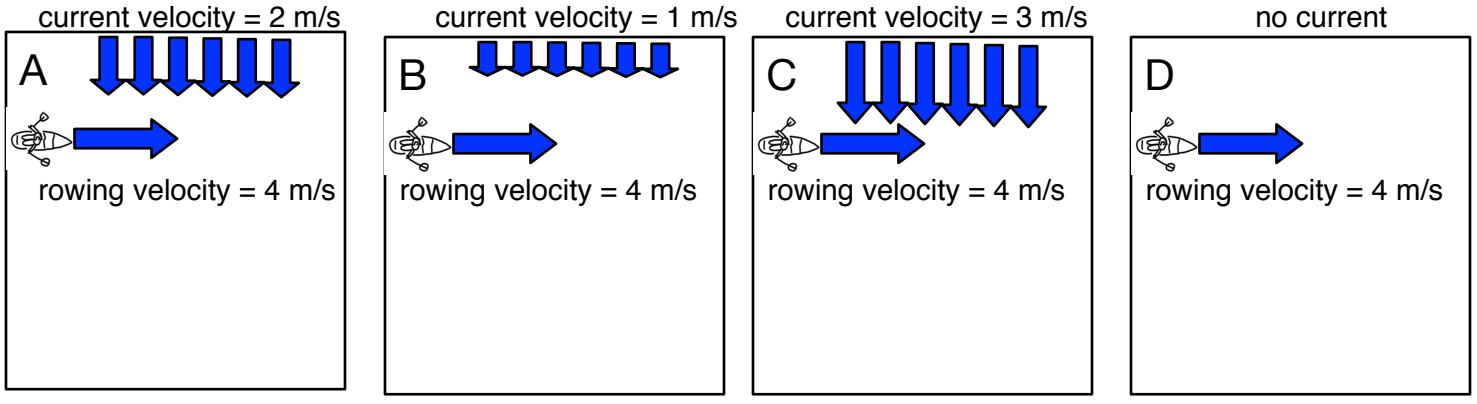
Cycle 18 2D Motion

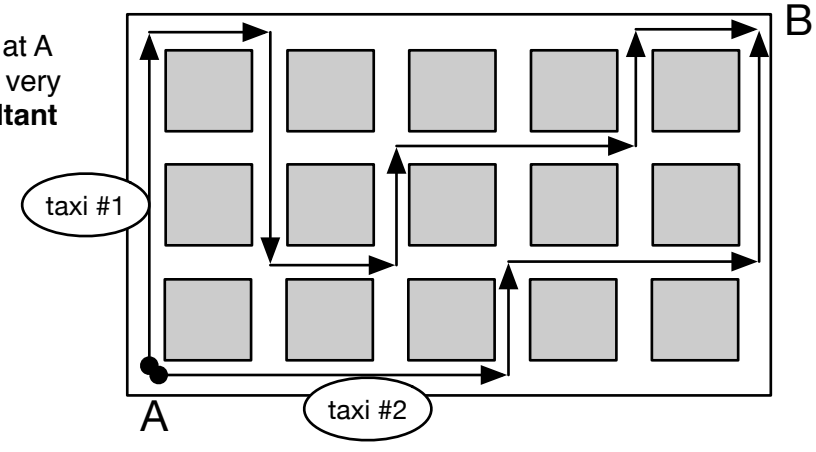
Review

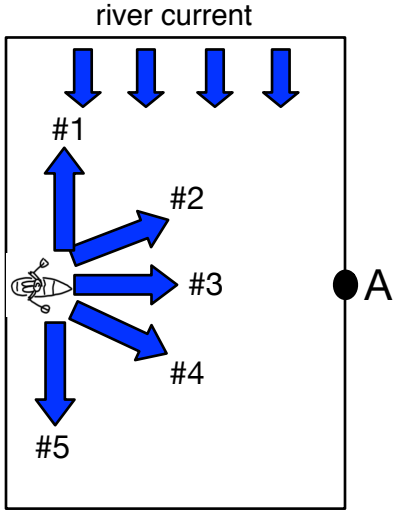


1) The same boat is rowing at the same velocity across the same river, but the current is different in each case (pictured above.) Rank the situations from most **time** to cross the river to least.

most _____ _____ _____ _____ least

2) Two taxis pick up passengers at the same spot at A and drop them off at the same spot at B, following very different routes. Which taxi has the greatest **resultant change in position**? Explain.



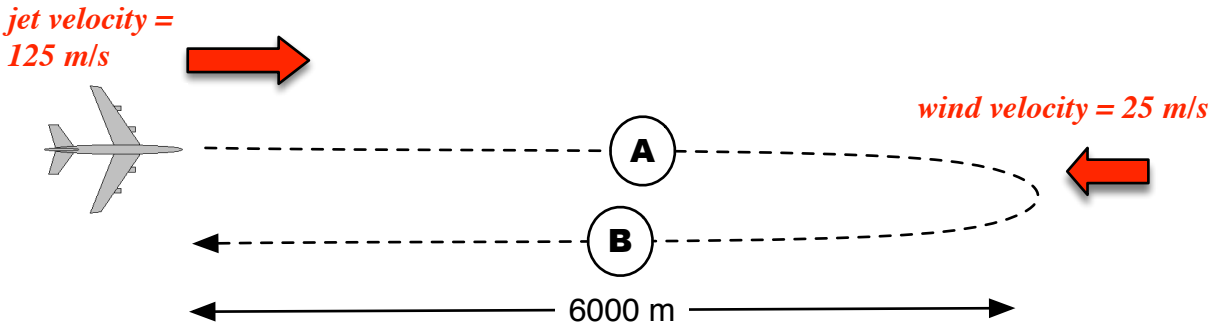


3) The boat has various choices for rowing across the river. Which direction will most likely result in…

a) Crossing the river the fastest? Explain.

b) Reaching point A? Explain.

4.



A The jet travels 6000 m **against** the wind.

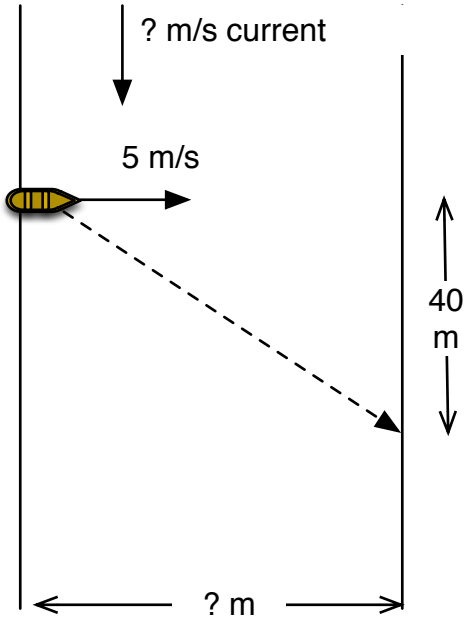
Resultant Velocity V = _____.

Solve for the time that part of the journey takes.

B The jet travels 6000 m **with** the wind.

Resultant Velocity V = _____.

Solve for the time that part of the journey takes.



The motorboat's velocity is 5 m/s pointed straight across the river. The crossing takes 10 seconds and in that time the current carries the motorboat 40 m downstream.

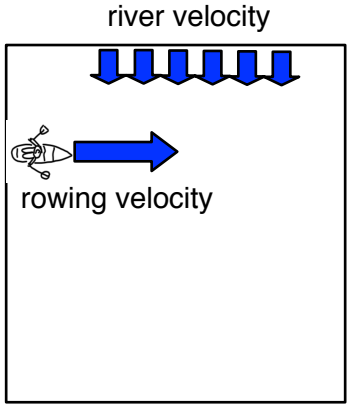
(a) How wide is the river?

(b) What is the velocity the current?

(c) If the current were twice as fast, how long would it take to cross?

Cycle 18 2D Motion

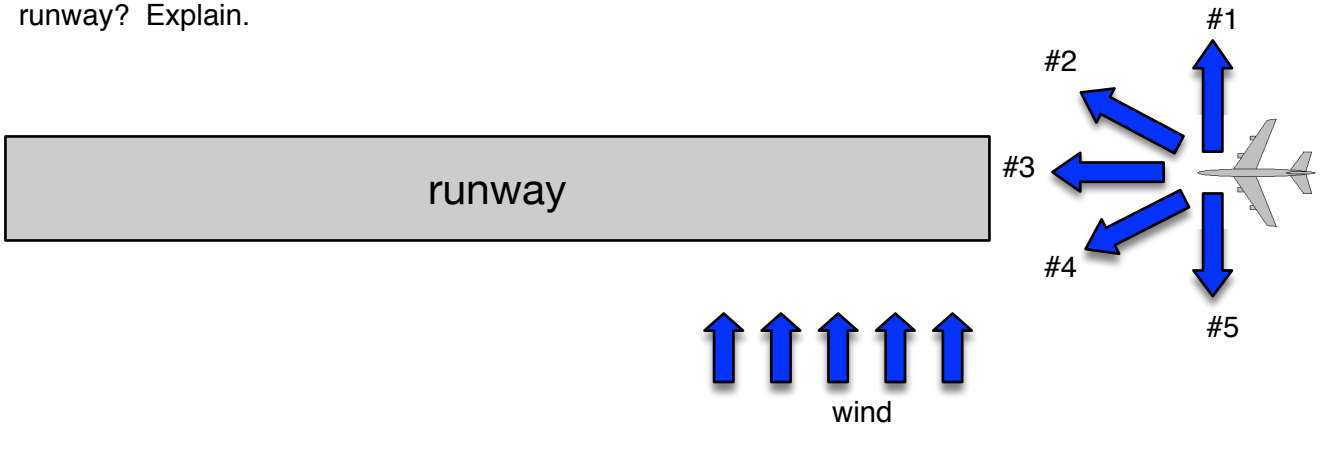
Quiz A



1) The savvy physics student, rowing directly across the river, has calculated the time of arrival on the opposite side. But during the trip, the current speeds up. How will that affect the time of arrival at the other side? Explain.

2) On Monday, you head to school from where you live to your favorite parking spot in the high school lot. On Tuesday, you head to school from where you live but run into construction and have to take a much longer route to school. Somehow, you still managed to park in your favorite spot. On which day did you have the greater resultant change in position? Explain.

3) The wind is blowing as shown. Which direction of flight will keep the jet aimed properly to land on the runway? Explain.



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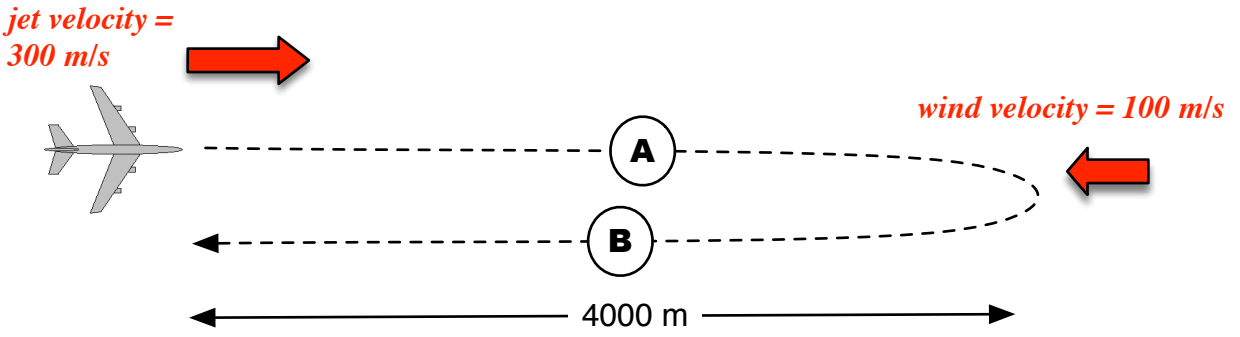


A The jet travels 4000 m against the wind.

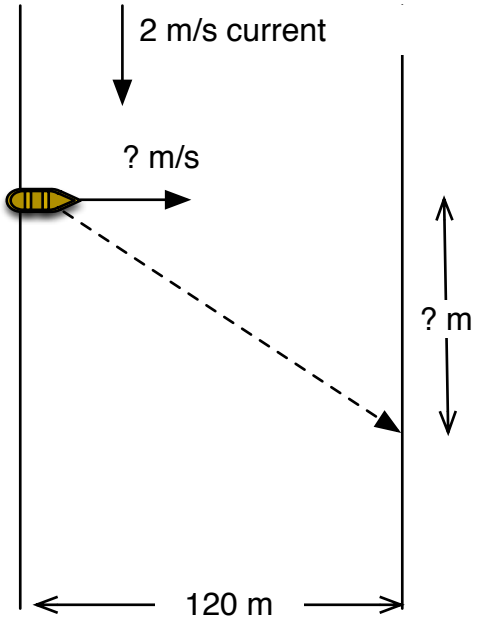
Resultant Velocity V = _____.

Solve for the time that part of the journey takes.

B The jet travels 4000 m with the wind.

Resultant Velocity V = _____.

Solve for the time that part of the journey takes.



5. The motorboat's velocity is pointed straight across the river. The current runs at 2 m/s downstream. The crossing takes 20 seconds and the river is 120 m across.

(a) What is the velocity of the boat?

(b) How far downstream does the boat end up?

(c) If the current were twice as fast, how long would it take to cross?

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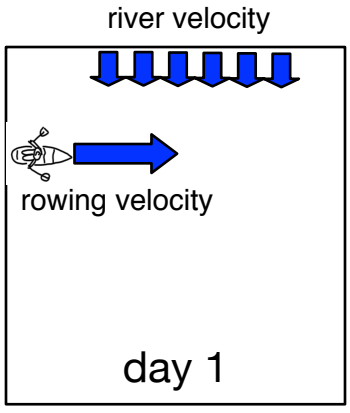
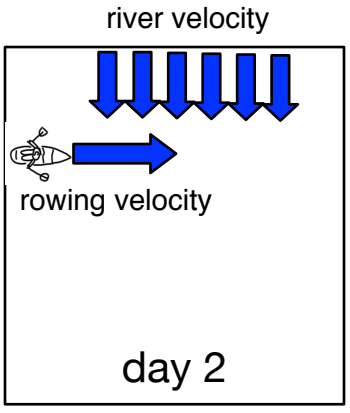
Quiz B

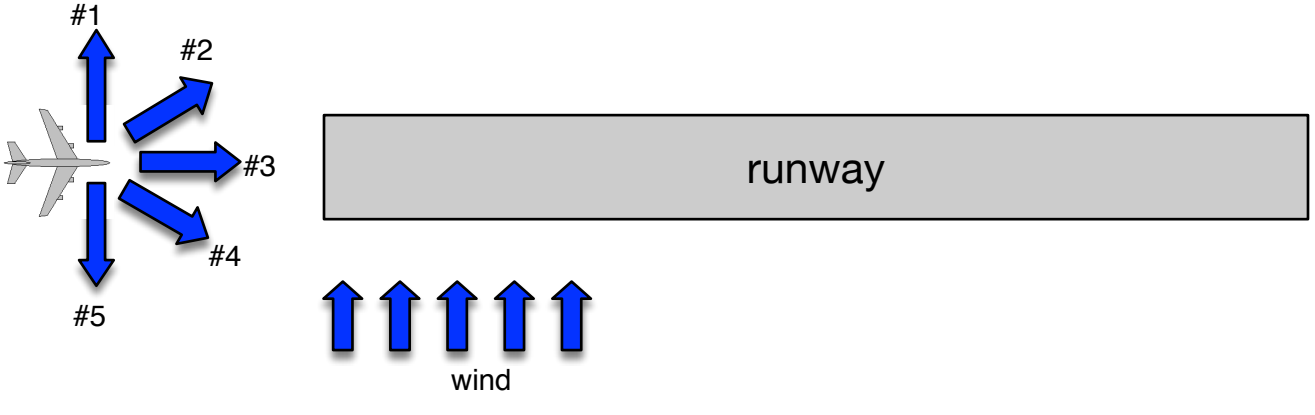


1) In the day 1 quarter finals of a river cross race, the current is fairly slow. In the day 2 quarterfinals, the current is much faster. The rowers on day 2 complain to the judges that the day 1 rowers had an unfair advantage. What should the judges do?



2) Last summer, you got a direct flight from Philadelphia International Airport to Orlando. This summer, you had to fly first to Chicago, and then take a connecting flight to Orlando - a much longer route. In which case did you have the greater resultant change in position? Explain.

3) The wind is blowing as shown. Which direction of flight will keep the jet aimed properly to land on the runway? Explain.



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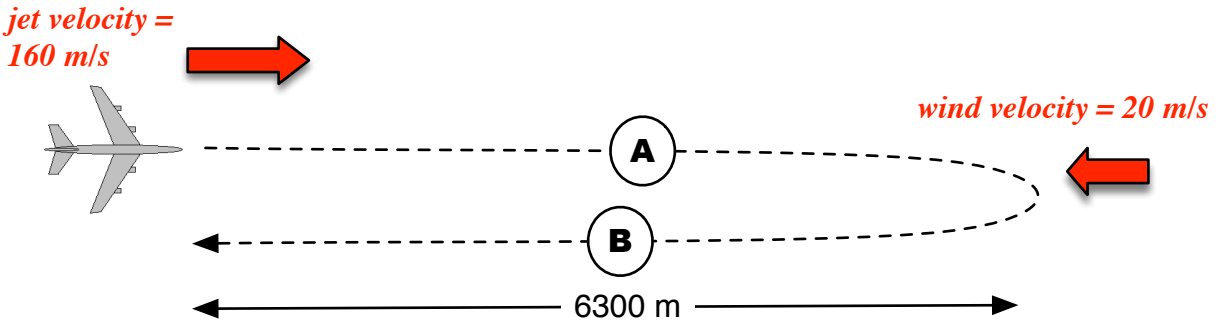


A The jet travels 6300 m against the wind.

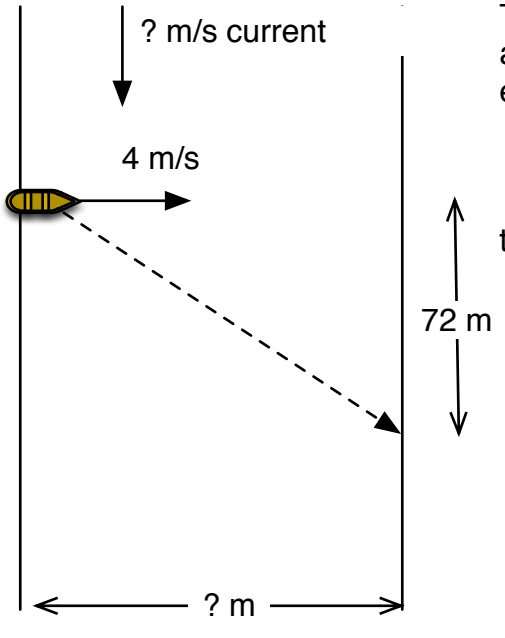
Resultant Velocity V = _____.

Solve for the time that part of the journey takes.

B The jet travels 6300 m with the wind.

Resultant Velocity V = _____.

Solve for the time that part of the journey takes.



The motorboat's velocity is 4 m/s and is pointed straight across the river. The crossing takes 9 seconds and the boat ends up 72 m downstream.

(a) What is the velocity of the current?

(b) How wide is the river?

(c) If the current were twice as fast, how long would it take to cross?

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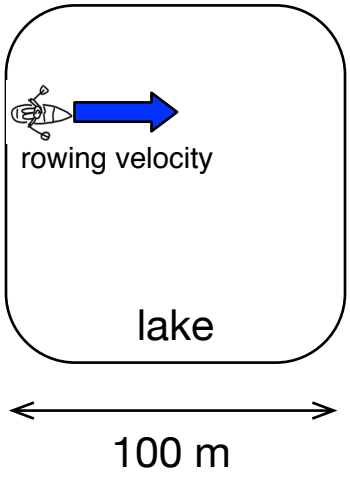
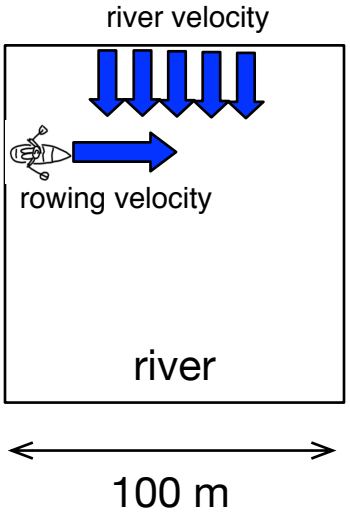
Quiz C

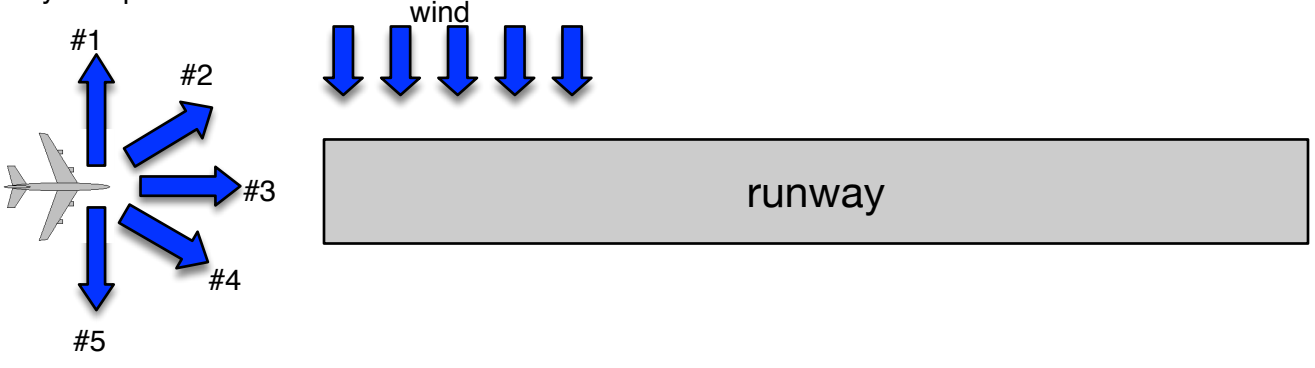


1) In the preliminaries for the 100 m rowing sprint race, some of the rowers compete on a lake, which has no current. Others row on a river with a cross current. The rowers on the river complain to the judges that the rowers on the lake have an unfair advantage because there was no current. What should the judges do?



2) You and your friend go food shopping together. You take a very efficient route, going only down the aisles that you need to. Your friend goes up and down every single aisle. Both of you end up checking out at the same register. From the front door to the register, who had the smallest resultant change in position - you or your friend? Explain.

3) The wind is blowing as shown. Which direction of flight will keep the jet aimed properly to land on the runway? Explain.



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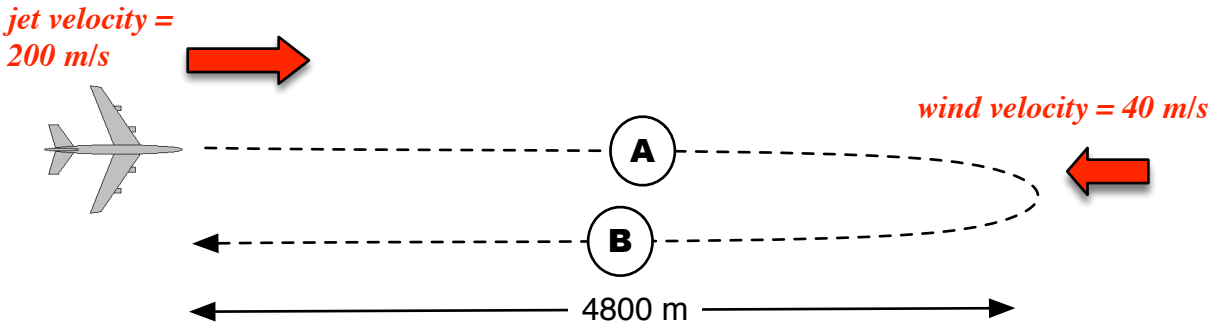


A The jet travels 4800 m against the wind.

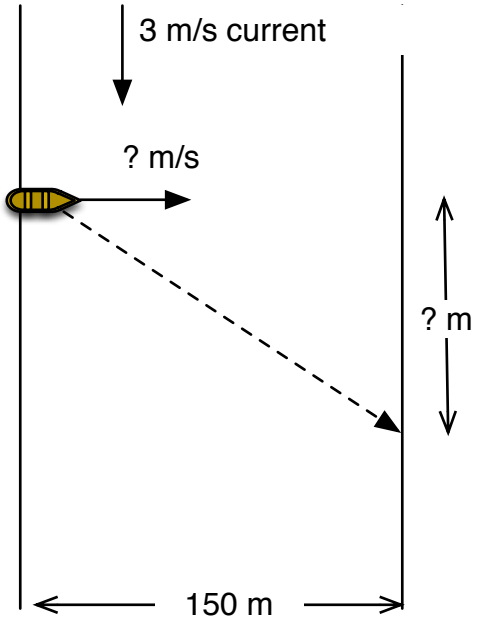
Resultant Velocity V = _____.

Solve for the time that part of the journey takes.

B The jet travels 4800 m with the wind.

Resultant Velocity V = _____.

Solve for the time that part of the journey takes.



The motorboat's velocity is pointed straight across the river. The velocity of the current is 3 m/s downstream. The crossing takes 30 seconds and the river is 150 m across.

(a) What is the velocity of the boat?

(b) How far downstream does the boat end up?

(c) If the current were twice as fast, how long would it take to cross?