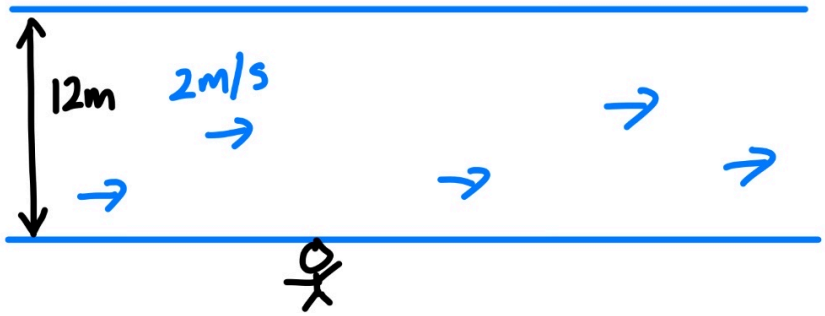
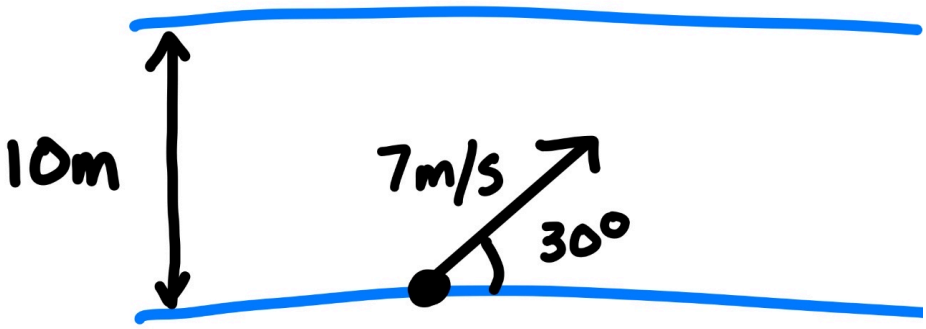
River Questions

1. Bob can swim at 3m/s and starts swimming North, across a river moving East at 2m/s.
    a) What would be his resultant velocity?
    b) If the river was 12m wide, how long would it take him to reach the other side of the river?



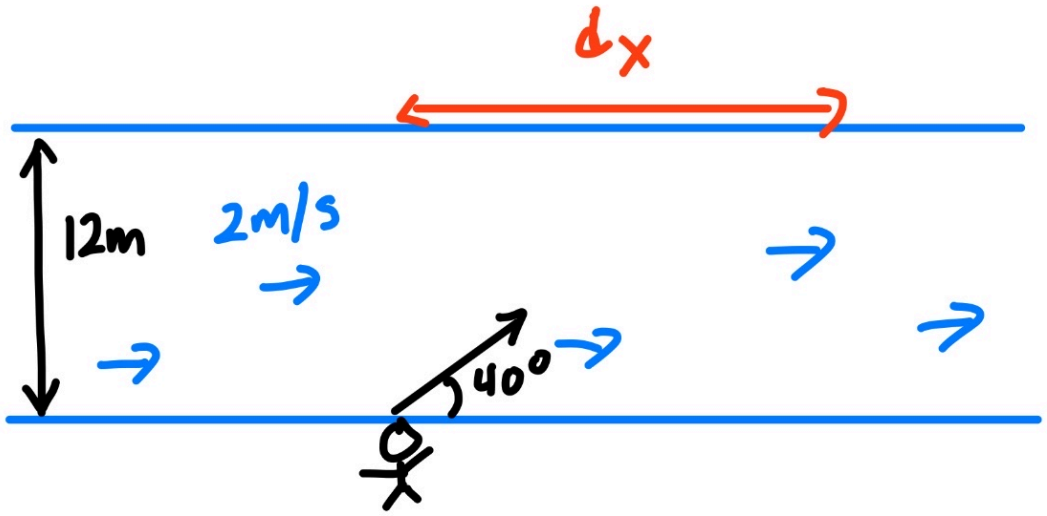
2. Jack swims with a velocity of 7m/s 30° N of E across a <u>still</u> river that is 10m wide.
    a) What is the vertical component of his velocity?
    b) What is the horizontal component of his velocity?
    c) How long will it take to cross the river?



3. Bob from question 1 decides to swim at an angle 3m/s 40° N of E across the same river with a current moving 2m/s E.

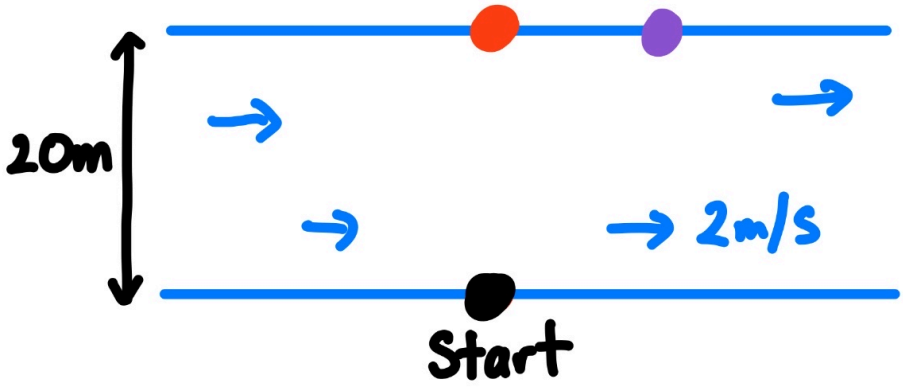
a) How long will it take to cross the river?

b) How far in the horizontal direction did he travel while crossing the river? (d_x).



4. Jane wants to swim across a river that is 20m wide. Jane can swim at 5m/s. The river has a current going to the right at 2m/s.

Jane starts at the black dot and wants to end up at the red dot.



a) At first, she decided to swim directly across the river by facing North. She ended up at the purple location. Why did this happen?

b) At what angle should Jane swim to end up at her desired location?

c) How long will it take Jane to cross the river this way?

Answers

1.

a) 3.61 m/s at 56.3° North of East

b) 4 s

2.

a) 3.5 m/s

b) 6.06 m/s

c) 2.86 s

3.

a) 6.22 s

b) 26.73 m

4.

a) She ended up at the purple location because the river's current pushed her downstream (to the right) as she swam across.

b) 66.4° North of West

c) 4.37 s