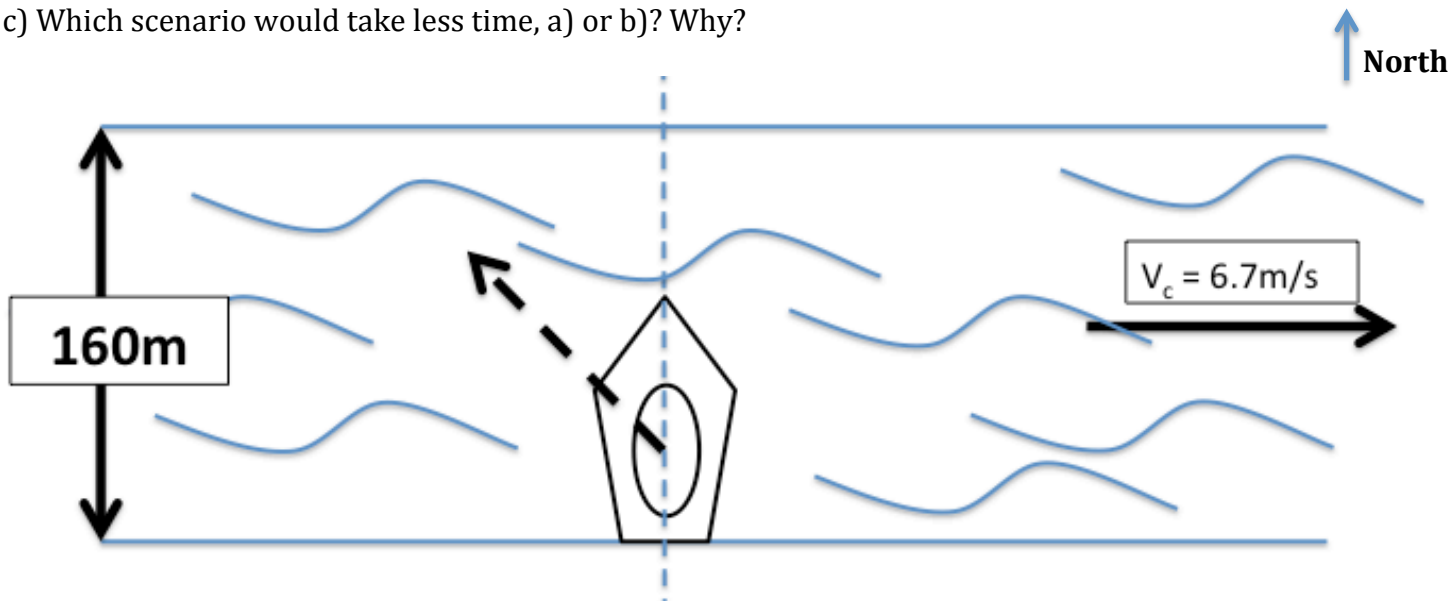


1) You throw a ball up with an initial velocity of $4.5 \pm 0.1 \text{ m/s}$. After $0.500 \pm 0.009 \text{ s}$:

- a) What is the final velocity of the ball?
b) What is the displacement of the ball?

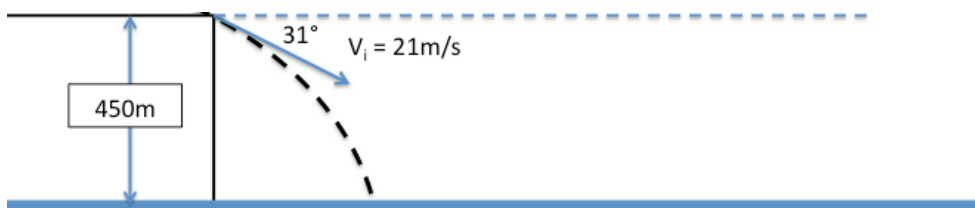
2) Your boat's engine can run your boat at 15 m/s on still water.

- a) If you want your boat to land directly north across the river from where you started (along the vertical line), in which direction should you point your boat? How long would it take to cross the river?
b) If you decided to steer your boat pointing north, what would your resultant velocity be? How far downstream would you be when you're on the other side of the river?
c) Which scenario would take less time, a) or b)? Why?



3) You throw a rock below the horizontal on a 450 m cliff as shown below. Find:

- a) The time it takes before the rock hits the ground
b) The final velocity of the rock right before it hits the ground
c) The horizontal distance from the cliff to where the rock hits the ground



ANS:

- 1) a) $(-0.40 \pm 0.02) \text{ m/s}$ b) $(1.0 \pm 0.1) \text{ s}$
2) a) 27° left of the vertical line, or 27° west of north, 12 s b) 16 m/s 24° east of north, 71 m downstream
 c) 11 s for b) so b) took less time since the boat's northward velocity component was bigger
3) a) 8.5 s b) 96 m/s 79° below the horizontal c) 150 m