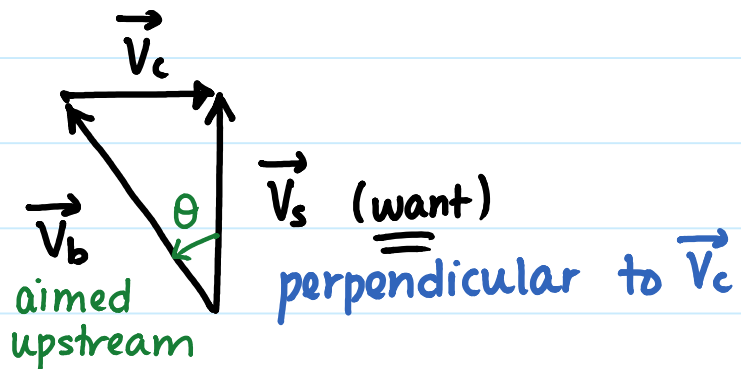


Getting Straight Across the River

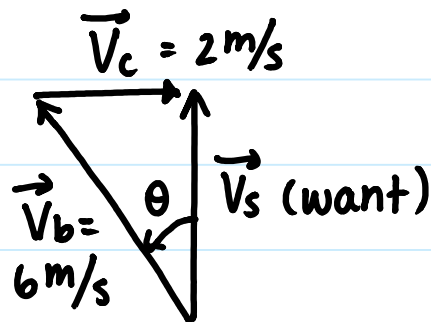
In order for something (boat, duck, swimmer, etc.) to go straight across the river, they must aim themselves upstream (into the current). The current will then push them into a straight resultant.



Example: A boat can travel 6 m/s in still water. It wants to travel due North in a river with a current of 2 m/s [E].
 \vec{V}_b (red arrow pointing up-right)
 \vec{V}_c (blue arrow pointing left)
 \vec{V}_s (green arrow pointing down-right)
 direction of \vec{V}_s (green text)

a) What angle must the boat aim itself in order to arrive straight across

(due North) the river ?



$$\theta = \sin^{-1} \left(\frac{2}{6} \right) = 19^\circ$$

always sine
for this scenario!

Boat must aim itself 19° W of N

opposite of \vec{V}_c

b) What is the speed of the boat as seen from shore ?

$$\vec{V}_s = ?$$

$$V_b^2 = V_c^2 + V_s^2$$

$$6^2 = 2^2 + V_s^2$$

$$36 = 4 + V_s^2$$

$$-4 \quad -4$$

$$\sqrt{32} = \sqrt{V_s^2}$$

$$5.7 \text{ m/s} = V_s$$

6, 7, 8