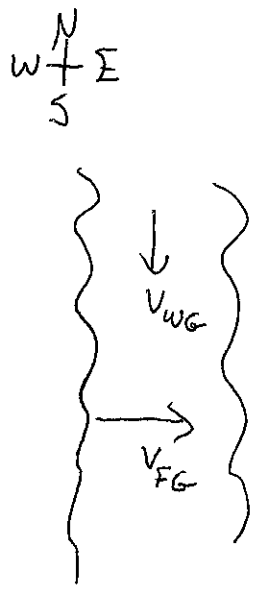


Due to a bridge closure a ferry is transporting vehicles across a 1500m wide river. A river watch station reports the river flowing at 1.7 m/s due south. If the ferry carries the vehicles directly across the river from West to East in 10. minutes, what is the ~~speed~~^{velocity} of the ferry with respect to the water?



$$V_{WG} = -1.7 \text{ m/s } \vec{j}$$

$$V_{FG} = 2.5 \text{ m/s } \vec{i}$$

speed of ferry: $v = \frac{\Delta x}{\Delta t}$

$$\frac{1500 \text{ m}}{10, \text{ min } \left(\frac{60 \text{ s}}{1 \text{ min}} \right)} = 2.5 \text{ m/s}$$

$$\vec{V}_{FW} = \vec{V}_{FG} + \vec{V}_{GW}$$

$$= (2.5 \text{ m/s}) \vec{i} + (1.7 \text{ m/s}) \vec{j}$$

$$\vec{V}_{FW} = (2.5 \text{ m/s}) \vec{i} + (1.7 \text{ m/s}) \vec{j}$$

In magnitude-angle notation

$$V_{FW} = \sqrt{(2.5 \text{ m/s})^2 + (1.7 \text{ m/s})^2} = 3.02 \text{ m/s}$$

$$\theta = \tan^{-1}\left(\frac{2.5}{1.7}\right) = 55.8^\circ$$

3.0 m/s @ ~~55~~ 56° N of E