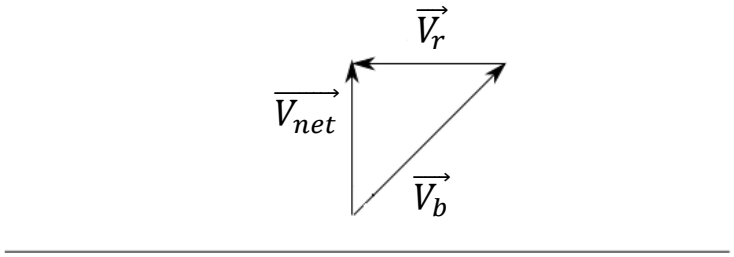
Answer on Question 47905, Physics, Mechanics | Kinematics | Dynamics

Question:

A boat propelled so as to travel with a speed of 0.50m/s in still water, moves directly (in a straight line) across a river that is 60m wide. The river flows with a speed of 0.30m/s. How long in seconds does it take the boat to cross the river?

Solution:



Let the $\overrightarrow{V_b}$ is the boat speed in still water, $\overrightarrow{V_b}$ is the speed of river and $\overrightarrow{V_{net}}$ is the net speed of the boat, and let us build the vector diagram. In order to find $\overrightarrow{V_{net}}$ we apply the Pythagorean theorem:

$$V_{net} = \sqrt{(V_b)^2 - (V_r)^2} = \sqrt{\left(0.5\frac{m}{s}\right)^2 - \left(0.3\frac{m}{s}\right)^2} = 0.4\frac{m}{s}$$

Now when we obtain the net speed of the boat, we can find the time that take the boat to cross the river:

$$t = \frac{S}{V_{net}} = \frac{60m}{0.4\frac{m}{s}} = 150s$$

Answer:

$t = 150s$