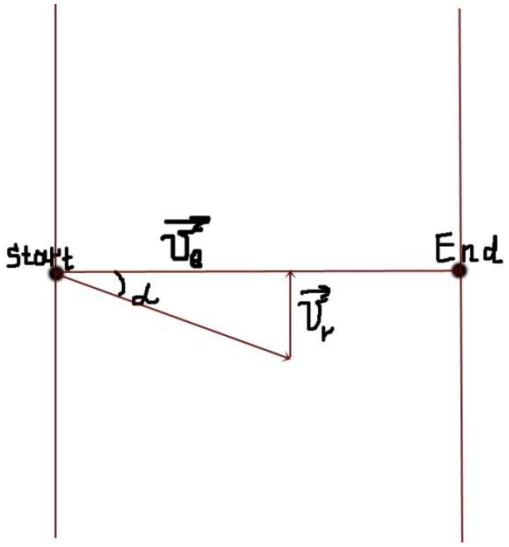
Answer on Question #45832, Physics, Mechanics | Kinematics | Dynamics

Task: A boat is moving at 30 km/h in crossing a river in which the current is flowing at 12 km/h. In what direction should the boat head if it is to reach a point on the other side of the river directly opposite its starting point.check your answer with a graphical solution.

Answer:



$\bar{V}_b = 30km/h;$

$\bar{V}_r = 12km/h;$

The resultant speed is the hypotenuse: $\sqrt{30^2 + 12^2} = \sqrt{1044} \approx 32.31$

but the boat is moving at an angle relative to the perpendicular-line that connects two points on opposite banks, because the current will always reject at a small angle to the direction of flow. Let the angle is $\alpha, so \tan\alpha = \frac{12}{30} \Rightarrow \alpha = \arctan\frac{6}{15}$

therefore the boat is moving at an angle $\alpha = \arctan\frac{6}{15}$ against the direction of traffic flow.