Answer on Question #79865, Physics / Mechanics | Relativity

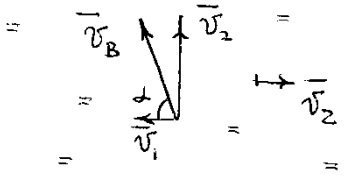
Question:

A fisherman wishes to travel due north M in order to cross a river 3km flowing due east at 2km/hr. if it can roll at 8km.hr in still water, calculate a)the direction in which it must head its boat in order to get his destination direct opposite the starting point

b)resultant velocity of boat in the river

c)time taken to cross the river

Solution:



The movement should be done under the angle α with respect to the line of the river so $v_B \cos\alpha = v_r$, where v_B is boat velocity, v_r - velocity of the river. Then $\alpha = \arccos\frac{2}{8}$ = 75.6°. Respectively crossing time $\tau = \frac{l}{v_2} = \frac{l}{v_B \sin\alpha} = \frac{3}{8\sin 75.6}$ = 0.39 hr. Velocity of boat in the river v = v_2 = 7.8 km/hr.

The answer:

a) direction α is 75.6°

b) resultant velocity of boat in the river is 7.8 km/hr.

c)time taken to cross the river is 0.39 hr.