Phys101 Assignment Cover Sheet

First Name:_____ Last Name:_____ Mark: _____

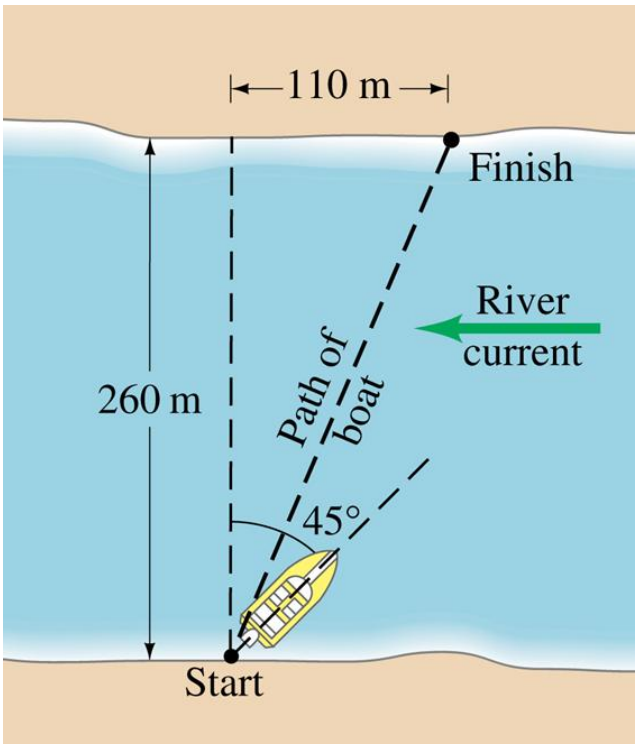
Student ID:_____ Date: _____

Phys101 Written Assignment #2

Due Wed/Thur. Jan 19/20, 2011, at the end of tutorial

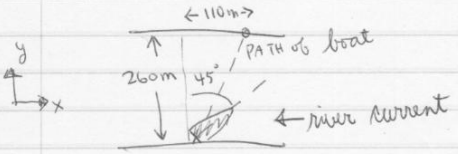
Textbook (Giancoli, 6th edition) page 68 problem #46.

46. A boat, whose speed in still water is 1.70 m/s, must cross a 260-m-wide river and arrive at a point 110 m upstream from where it starts. To do so, the pilot must head the boat at a 45 ºupstream angle. What is the speed of the river's current?



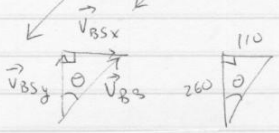
P101 WRITTEN ASSIGNMENT #2

46) A boat, whose speed in water is 1.70 m/s, must cross a 260 m wide river and arrive at a point 110 m upstream from where it starts. To do so, a pilot must head the boat at a 45° upstream angle. What is the speed of the river's current?



$\vec{v}_{BS_y} = |\vec{v}_{BS}| \cos\theta$

$\vec{v}_{BS_x} = |\vec{v}_{BS}| \sin\theta$



$\tan\theta = \frac{O}{A} = \frac{110}{260}$

$\theta = 22.9°$

$\vec{v}_{BW} + \vec{v}_{WS} = \vec{v}_{BS}$

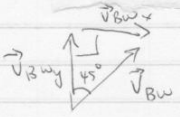
$\therefore v_{BW_x} + v_{WS_x} = v_{BS_x}$

$1.20 + v_{WS_x} = |\vec{v}_{BS}| \sin 22.9°$

$v_{BW_y} + v_{WS_y} = v_{BS_y}$

$1.20 = |\vec{v}_{BS}| \cos 22.9°$

$|\vec{v}_{BS}| = 1.30$ m/s



$|\vec{v}_{BW}| = 1.70$ m/s

$|\vec{v}_{BW_x}| = |\vec{v}_{BW}| \sin 45°$
$= 1.20$ m/s

$|\vec{v}_{BW_y}| = |\vec{v}_{BW}| \cos 45°$
$= 1.20$ m/s

$\therefore 1.20 + v_{WS_x} = 1.30 (\sin 22.9°)$

$v_{WS_x} = -0.69$ m/s

the speed of the current is 0.69 m/s

Hilroy