PHYS 111
HOMEWORK #4

Due : 22 Sept. 2016

1. A boat travels a distance D along a straight river from point A to point B. In still water, the boat can travel at a constant speed of V_b with respect to the shoreline. The river has a current whose speed is V_R with respect to the shore, and which moves in the direction of A to B.

a) What is the speed of the boat with respect to the shore if it travels from A to B? (5)

b) What is the speed of the boat with respect to the shore if it travels from B to A? (5)

c) Show that the time needed for the boat to make a round trip between A and B is given by : (10)

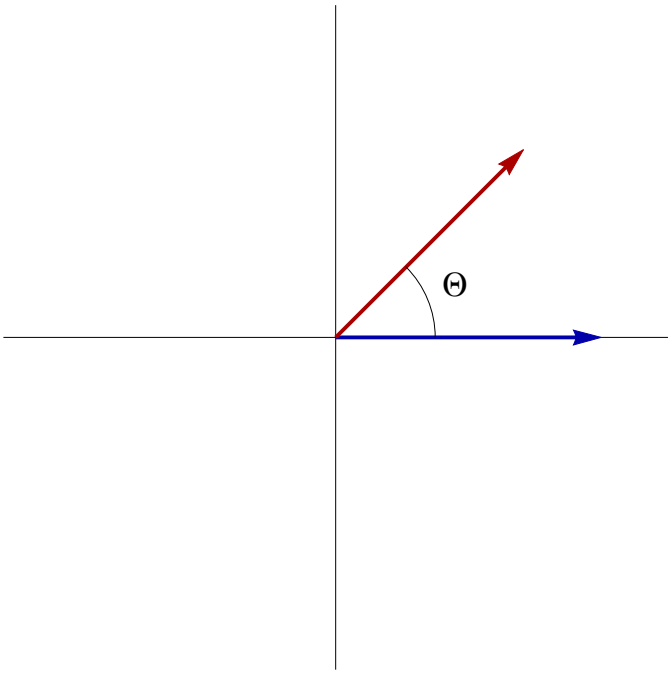
$$t = \frac{2 V_b D}{V_b^2 - V_R^2}$$

d) Explain the meaning of the answer you obtain in the case where $V_R = V_b$ (5)

2. Problem 26, page 60 text.

3. Problem 28, page 60, text.

4. A box is located at the origin of a coordinate system. One force of magnitude 720N acts along the positive x axis (as denoted by the blue arrow) and another force pulls on the box with a force of magnitude 360N directed at angle 45^o above the postive x axis. What is the total force on the box, and what angle does the resultant force make with respect to the positive x axis? ("N" stands for Newton, the SI (or MKS) unit of force.)



5. Problem 46, p. 25, text.

6. A ball is dropped from rest from the top of a building of height H. Assuming air resistance is negligible, determine the speed of the ball when it hits the ground and also the time it takes for the ball to hit the ground.