Honors Physics 2D Kinematics HW, part 2 (Homework)

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1.
A boat moves through the water of a river at 7 m/s relative to the water, regardless of the boat's direction. If the water in the river is flowing at 1.4 m/s, how long does it take the boat to make a round trip consisting of a 285 m displacement downstream followed by a 285 m displacement upstream?

2.
A river flows due east at 1.10 m/s. A boat crosses the river from the south shore to the north shore by maintaining a constant velocity of 9.0 m/s due north relative to the water.
(a) What is the velocity of the boat relative to shore?
(b) If the river is 290 m wide, how far downstream has the boat moved by the time it reaches the north shore?

3.
A rowboat crosses a river with a velocity of 3.30 mi/h at an angle 62.5° north of west relative to the water. The river is 0.505 mi wide and carries an eastward current of 1.25 mi/h. How far upstream is the boat when it reaches the opposite shore?

4.
The pilot of an aircraft wishes to fly due west in a 57.0 km/h wind blowing toward the south. If the speed of the aircraft relative to the air is 205 km/h,
(a) in what direction should the aircraft head, and
(b) what will be its speed relative to the ground?

5.
A hunter wishes to cross a river that is 2.3 km wide and flows with a speed of 5.0 km/h parallel to its banks. The hunter uses a small powerboat that moves at a maximum speed of 14 km/h with respect to the water. What is the minimum time necessary for crossing?