NAME _____ DATE _____ CLASS _____

Two-Dimensional Motion and Vectors

HOLT PHYSICS

Diagram Skills

Relative Motion

The water current in a river moves relative to the land with a velocity v_{WL}, and a boat is traveling on the river relative to the current with a velocity v_{BW}.

1. How is the velocity of the boat relative to the land ($\mathbf{v_{BL}}$) related to $\mathbf{v_{WL}}$ and $\mathbf{v_{BW}}$?

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2. Suppose that both the boat and the water current move in the same direction and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, $\mathbf{v_{BL}}$.

2.

3. Suppose that the boat travels in the opposite direction of the current and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, $\mathbf{v_{BL}}$.

3.

4. Suppose that the boat travels in a direction perpendicular to the current and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, $\mathbf{v_{BL}}$.

4.

5. Assume that the boat travels with a speed of 4.0 km/h relative to the current and that the current moves due east at a speed of 2.0 km/h relative to the land. Determine the velocity of the boat relative to the land for each of the situations described in items 2–4.

a. $\mathbf{v_{BL}}$ for item 2 _____

b. $\mathbf{v_{BL}}$ for item 3 _____

c. $\mathbf{v_{BL}}$ for item 4 _____

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