SpringBoard Unit 5 Name_____

Rational Equations Word Problems

Example #1: You spend an afternoon paddling on a river in your canoe. You travel 3 miles upstream and 3 miles downstream. In still water, the canoe can travel at an average speed of 2 miles per hour.

A) **Write the expressions for the canoe's downstream and upstream speed. Let *c* be the speed of the current.**

HINT: When you paddle with the current (downstream), the canoe's speed is the sum of your paddling speed and the current's speed. When you paddle against the current (upstream), the canoe's speed is the difference of your speed and the current's speed.

Downstream: Upstream:

HINT: Divide the distance traveled in each direction by the canoe's speed in that direction to find the time for that part of the trip.

Downstream time: Upstream time:

B) **Write an equation that would represent the total time it takes for your canoe trip.**

C) **Suppose the whole journey took 4 hours. Determine the speed of the current. Is your answer reasonable?**

EXAMPLE 6 Stephanie took her kayak to the Kaweah River, which flows downstream at a rate of 2 kilometers per hour. She paddled 15 km upstream, and then paddled downstream to her starting point. If this round-trip took a total of 4 hours, find the speed that Stephanie can paddle in still water.

3. Chase canoes on a river 3 miles upstream and 3 miles downstream in a total of 5 hours. The river's current is moving at 1 mile per hour.

a) Downstream speed: Upstream Speed:

b) Downstream time: Upstream time:

c) Solve for Chase's speed in still water.

4. A river barge travels at an average rate of 8 miles per hour in still water. The barge travels 60 miles up the Mississippi River and 60 miles down the river in a total of 16.5 hours.

a) Downstream speed: Upstream Speed:

b) Downstream time: Upstream time:

c) Set up and solve the equation that is represented by this situation.

5. On a clear sunny day with no wind you can run at a speed of 5 miles per hour. Suppose you are running on a windy day with wind speed *w*. You are doing your daily run where you travel 2 miles to a park and then 2 miles back. The total trip takes 1.5 hours.

a) What are the expressions that represent your speed going to the park and going back home?

b) What are the expressions that represent the time it takes to go to the park and then to go back home?

c) What is the equation that would represent the total time it takes for the runner to go to the park and back home?