## Problem 3 Are We There Yet?

A distance problem is a type of problem that involves distance, rate, and time.

1. A river barge travels 140 miles from a loading dock to a warehouse to deliver supplies. Then the barge returns to the loading dock. The barge travels with the current to the warehouse and against the current from the warehouse. The barge's total travel time is 20 hours, and it travels in still water at an average speed of 15 miles per hour.
a. Use the given information to complete the table. Let $x$ represent the average speed of the current.

|  | Distance Traveled | Time Traveled | Average Speed |
| :---: | :---: | :---: | :---: |
|  | Miles | Hours | $\frac{\text { Miles }}{\text { Hours }}$ |
| With the Current |  |  | $15+x$ |
| Against the <br> Current | 140 | 20 |  |
| Round Trip |  |  |  |

b. You are given that the barge's total travel time is 20 hours. Write an algebraic expression, in terms of the number of hours the barge travels with the current and the number of hours it travels against the current, that is equivalent to 20 hours.
c. Write and solve an equation to calculate the average speed of the current.

## problem 4 How Much Is It?

A cost problem is a type of problem that involves the cost of ownership of an item over time.

Melinda has decided that it is time to replace her old refrigerator. She purchases a new Energy Star certified refrigerator. Energy Star certified refrigerators use less electricity than those that are not certified. In the long run, the Energy Star refrigerator should cost Melinda less to operate.

1. Melinda purchases a new Energy Star refrigerator for $\$ 2000$. The refrigerator costs \$46 per year to operate.
a. Assume that the refrigerator is reliable and its only costs of ownership are the purchase price and the cost of operation. Determine Melinda's average annual cost of owning the new refrigerator for the given number of years.

1 year:

5 years:

10 years:
b. Write an expression to represent Melinda's average annual cost of owning the new refrigerator for $x$ years.
c. When Melinda's average annual cost of owning the refrigerator is less than $\$ 400$, she plans to shop for a new television. When can Melinda shop for a new television?

