To Kearney by Equation

Do Now: Answer the following questions:

1. How many minutes is in 1 hour?	*2. What part of an hour is 30 minutes?*
3. What part of an hour is 20 minutes?	*4. What part of an hour is 10 minutes?*

As you read the task on page 33, underline any word you think might be important. Write a question mark next to any concept you don't understand and circle any word you don't understand. Draw a box around the question or task you are being asked to complete, if any.

Vocabulary/Concept Bank

Important term	Definition
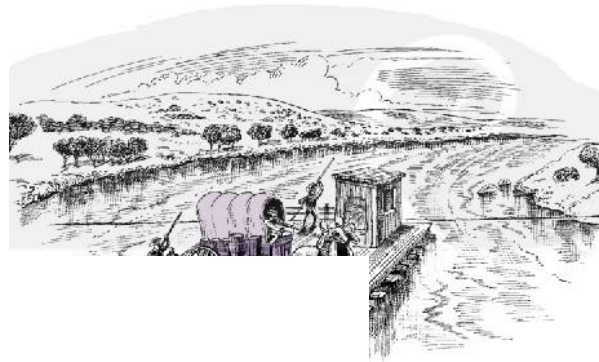
To Kearny by Equation

When the first emigrants went west, crossing rivers was dangerous and time-consuming. Travelers were grateful and travel time was shortened when people started ferries to shuttle wagons across the rivers.

The first major stop along the way from Westport to Fort Laramie was at Fort Kearny (now Kearney, Nebraska).

Joseph and Louis Papan, two brothers, were of mixed blood. They had one Native American parent and one parent of European origin. They operated a ferry over the Kansas River at Topeka, on the way from Westport to Fort Kearny.

We don't know how the Papans set their rates, but you can make these assumptions.

- The fee for crossing the 230-yard-wide river was $2 for each wagon.

- The ferry captain received pay of 30¢ per hour from the Papans for the time he spent going back and forth.

The Papan brothers could then calculate the profit they made using the equation

$$\text{profit} = 2W - 0.3H$$

Here, W is the number of wagons that crossed the river, and H is the number of hours that the ferry captain spent going back and forth. This profit **formula** takes into account the captain's salary, but it does not take into account the Papans' other expenses, such as upkeep of the boat.

1. Explain why this formula makes sense.	
2. Write an expression for the amount that *each* Papan brother made. Assume they split the profit equally.	

Now, add these assumptions:
- A round trip on the ferry took 20 minutes.
- A wagon could hold at most 6 people. A group of between 7 and 12 people required two wagons, a group of between 13 and 18 required three wagons, and so on. Every group had at least one wagon.
- The ferry could hold up to four wagons and their passengers. Larger families required more than one ferry trip.

3. How much profit would each Papan brother make from the family unit for which you are responsible?	

4. How much profit would each Papan brother make from your group's four family units?	
5. Is there another way to do this?	

Summary: Why were the two equations we discussed really the same equation?	

Vocabulary to be used during the discussion: Equivalent Expressions, Distributive Property, Denominator