# Lesson 2: Proportional Relationships

## Classwork

### Example 1: Pay by the Ounce Frozen Yogurt!

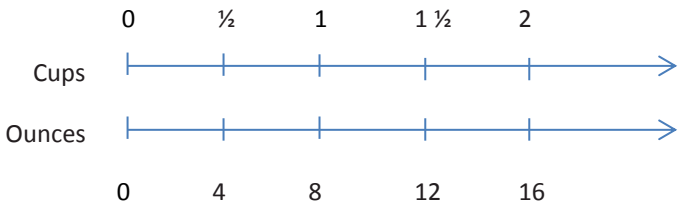
A new self-serve frozen yogurt store opened this summer that sells its yogurt at a price based upon the total weight of the yogurt and its toppings in a dish. Each member of Isabelle's family weighed their dish and this is what they found.

| Weight (ounces) | 12.5 | 10 | 5 | 8 |
|---|---|---|---|---|
| Cost ($) | 5 | 4 | 2 | 3.20 |

Cost _____ Weight.

### Example 2: A Cooking Cheat Sheet!

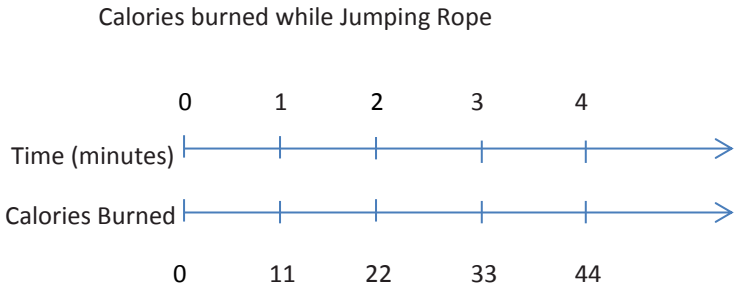
In the back of a recipe book, a diagram provides easy conversions to use while cooking.




Ounces _____Cups.

**Exercise 1**

During Jose's physical education class today, students visited activity stations. Next to each station was a chart depicting how many Calories (on average) would be burned by completing the activity.




a. Is the number of Calories burned proportional to time? How do you know?

b. If Jose jumped rope for 6.5 minutes, how many calories would he expect to burn?

## Example 3: Summer Job

Alex spent the summer helping out at his family's business. He was hoping to earn enough money to buy a new $220 gaming system by the end of the summer. Halfway through the summer, after working for 4 weeks, he had earned $112. Alex wonders, "If I continue to work and earn money at this rate, will I have enough money to buy the gaming system by the end of the summer?"

To check his assumption, he decided to make a table. He entered his total money earned at the end of week 1 and his total money earned at the end of Week 4.

| Week | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Total Earnings | | $28 | | | $112 | | | | |

a. Work with a partner to answer Alex's question.

b. Are Alex's total earnings proportional to the number of weeks he worked? How do you know?

**Lesson Summary:**

Measures in one quantity **are proportional to** measures of a second quantity if there is a positive number $k$ so that for every measure x of the first quantity, the corresponding quantity $y$ is given by $kx$. The equation $y = kx$ models this relationship.

A **proportional relationship** is one in which the measures of one quantity are proportional to the measures of the second quantity.

In the example given below, the distance *is proportional to* time since each measure of distance, $y$, can be calculated by multiplying each corresponding time, $t$, by the same value, 10. This table illustrates a *proportional relationship* between time, $t$, and distance, $y$.

| Time (hrs), t | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Distance (km), y | 0 | 10 | 20 | 30 |

## Problem Set

1. A cran-apple juice blend is mixed in a ratio of cranberry to apple of 3 to 5.
   a. Complete the table to show different amounts that are proportional.

| Amount of Cranberry | | | |
|---|---|---|---|
| Amount of Apple | | | |

   b. Why are these quantities proportional?

2. John is filling a bathtub that is 18 inches deep. He notices that it takes two minutes to fill the tub with three inches of water. He estimates it will take ten more minutes for the water to reach the top of the tub if it continues at the same rate. Is he correct? Explain.