Unit 3, Lesson 4

Comparing Proportional Relationships

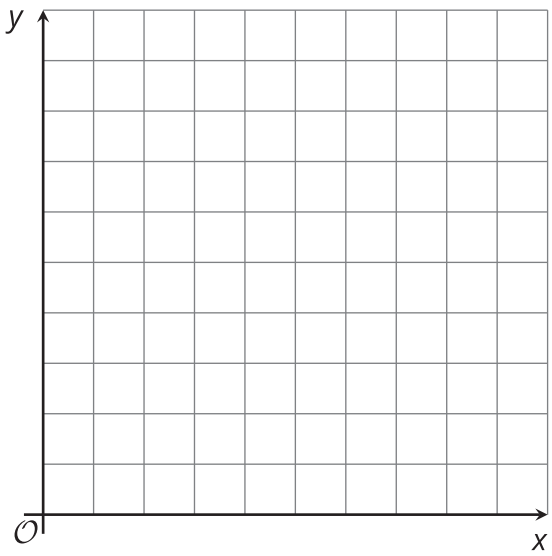
Let's compare proportional relationships.

4.1 What's the Relationship?

The equation $y = 4.2x$ could represent a variety of different situations.

1. Describe a situation that can be represented by this equation. What do the quantities x and y represent in your situation?

2. Create a table and a graph that represent the situation.



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4.2 Comparing Two Different Representations

1. Elena babysits her neighbor's children. Her earnings are given by the equation $y = 8.40x$, where x represents the number of hours she worked, and y represents the amount of money she earned in dollars.

   Jada earns $7 per hour mowing her neighbors' lawns.

   a. Who makes more money after working 12 hours? How much more do they make? Explain your reasoning by creating a graph or a table.

   b. What is the value of the **rate of change** for each situation, and what does each value mean?

   c. Using your graph or table, determine how long it would take each person to earn $150.

2. Clare and Han have summer jobs stuffing envelopes for two different companies.

Han earns $15 for every 300 envelopes he finishes.

Clare's earnings can be seen in the table.

number of envelopes	money earned in dollars
400	40
900	90

a. By creating a graph, show how much money each person makes after stuffing 1,500 envelopes.

b. What is the value of the rate of change for each situation, and what does each value mean?

c. Using your graph, determine how much more money one person makes relative to the other after stuffing 1,500 envelopes. Explain or show your reasoning.

3. Tyler plans to start a lemonade stand and is trying to perfect his recipe for lemonade. He wants to make sure the recipe doesn't use too much lemonade mix (lemon juice and sugar) but still tastes good.

   Recipe 1 is given by the equation $y = 4x$, where x represents the amount of lemonade mix in cups, and y represents the amount of water in cups.

   Recipe 2 is given in the table.

lemonade mix (cups)	water (cups)
10	50
13	65
21	105

   a. If Tyler had 16 cups of lemonade mix, how many cups of water would he need for each recipe? Explain your reasoning by creating a graph or a table.

   b. What is the value of the rate of change for each recipe, and what does each value mean?

   c. Tyler has 16 cups of lemonade mix to use for his lemonade stand. Which lemonade recipe should he use? Explain or show your reasoning.

Are you ready for more?

Han and Clare are still stuffing envelopes. Han can stuff 20 envelopes in a minute, and Clare can stuff 10 envelopes in a minute. They start working together on a pile of 1,000 envelopes.

1. How long does it take them to finish the pile?

2. Who earns more money?

Lesson 4 Summary

When two proportional relationships are represented in different ways, we can compare them by finding a common piece of information.

For example, Clare's earnings are represented by the equation $y = 14.50x$, where y is her earnings in dollars for working x hours.

The table shows some information about Jada's earnings.

time worked (hours)	earnings (dollars)
7	92.75
4.5	59.63
37	490.25

If we want to know who makes more per hour, we can look at the rate of change for each situation.

In Clare's equation, we see that the rate of change is 14.50. This tells us that she earns \$14.50 per hour. For Jada, we can calculate the rate of change by dividing her earnings in one row by the hours worked in the same row. For example, using the last row, the rate of change is 13.25 since $490.25 \div 37 = 13.25$. This tells us that Clare earns 1.25 more dollars per hour than Jada.