7th Grade Math Week 2

Dear Parent/Guardian,

During Week 2, the exploration of Proportional Relationships and their use in the Real-World will continue. Your child will make comparisons while using tables and use relationships to make conversions. Each student task ends with a 'Lesson Summary' section; there, your child can find targeted support for the lesson.

Additionally, students can access the HMH GoMath textbook through ClassLink. The site offers instructional support through links in the online textbook. By selecting embedded links, students can access the Personal Math Trainer for step-by-step examples, Math on the Spot for real-world connections and more examples, and Animated Math to help support conceptual understanding.

We also suggest that students have an experience with math each day. Practicing at home will make a HUGE difference in your child's school success! Make math part of your everyday routine. Choose online sites that match your child's interests. Online math games, when played repeatedly, can encourage strategic mathematical thinking, help develop computational fluency, and deepen their understanding of numbers.

Links for additional resources to support students at home are listed below:
https://www.adaptedmind.com/index.php
https://www.engageny.org/educational-activities-for-parents-and-students
https://www.khanacademy.org/resources/teacher-essentials
https://www.multiplication.com/games/all-games
https://www.prodigygame.com/

Week 2 At A Glance	
Day 1	Unit 2, Lesson 7 – Comparing Relationships with Tables ☐ Student Tasks 7.1, 7.2, and 7.3 followed by Lesson 7 Summary ☐ Practice Problems
Day 2	Unit 2, Lesson 8 – Comparing Relationships with Equations ☐ Student Tasks 8.1, 8.2, 8.3, and 8.4 followed by Lesson 8 Summary ☐ Practice Problems
Day 3	Unit 2, Lesson 9 – Solving Problems about Proportional Relationships ☐ Student Tasks 9.1, 9.2, and 9.3 followed by Lesson 9 Summary ☐ Practice Problems
Day 4	Unit 2, Lesson 10 – Introducing Graphs of Proportional Relationships ☐ Student Tasks 10.1, 10.2, and 10.3 followed by Lesson 10 Summary ☐ Practice Problems
Day 5	Unit 2, Lesson 11 – Interpreting Graphs of Proportional Relationships ☐ Student Tasks 11.1, 11.2, and 11.3 followed by Lesson 11 Summary ☐ Practice Problems

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Unit 2, Lesson 7
Comparing Relationships with Tables

Let’s explore how proportional relationships are different from other relationships.

7.1 Adjusting a Recipe

A lemonade recipe calls for the juice of 5 lemons, 2 cups of water, and 2 tablespoons of honey.

Invent four new versions of this lemonade recipe:

1. One that would make more lemonade but taste the same as the original recipe.

2. One that would make less lemonade but taste the same as the original recipe.

3. One that would have a stronger lemon taste than the original recipe.

4. One that would have a weaker lemon taste than the original recipe.

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7.2 Visiting the State Park

Entrance to a state park costs $6 per vehicle, plus $2 per person in the vehicle.

1. How much would it cost for a car with 2 people to enter the park? 4 people? 10 people? Record your answers in the table.

number of people in vehicle	**total entrance cost in dollars**
2	
4	
10	

2. For each row in the table, if each person in the vehicle splits the entrance cost equally, how much will each person pay?

3. How might you determine the entrance cost for a bus with 50 people?

4. Is the relationship between the number of people and the total entrance cost a proportional relationship? Explain how you know.

Are you ready for more?

What equation could you use to find the total entrance cost for a vehicle with any number of people?

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7.3 Running Laps

Han and Clare were running laps around the track. The coach recorded their times at the end of laps 2, 4, 6, and 8.

Han's run:

distance (laps)	time (minutes)	minutes per lap
2	4	
4	9	
6	15	
8	23	

Clare's run:

distance (laps)	time (minutes)	minutes per lap
2	5	
4	10	
6	15	
8	20	

1. Is Han running at a constant pace? Is Clare? How do you know?

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2. Write an equation for the relationship between distance and time for anyone who is running at a constant pace.

Lesson 7 Summary

Here are the prices for some smoothies at two different smoothie shops:

Smoothie Shop A

smoothie size (oz)	price ($)	dollars per ounce
8	6	0.75
12	9	0.75
16	12	0.75
s	$0.75s$	0.75

Smoothie Shop B

smoothie size (oz)	price ($)	dollars per ounce
8	6	0.75
12	8	0.67
16	10	0.625
s	???	???

For Smoothie Shop A, smoothies cost $0.75 per ounce no matter which size we buy. There could be a proportional relationship between smoothie size and the price of the smoothie. An equation representing this relationship is

$$p = 0.75s$$

where s represents size in ounces and p represents price in dollars. (The relationship could still not be proportional, if there were a different size on the menu that did not have the same price per ounce.)

For Smoothie Shop B, the cost per ounce is different for each size. Here the relationship between smoothie size and price is definitely *not* proportional.

In general, two quantities in a proportional relationship will always have the same quotient. When we see some values for two related quantities in a table and we get the same quotient when we divide them, that means they might be in a proportional relationship—but if we can't see all of the possible pairs, we can't be completely sure. However, if we know the relationship can be represented by an equation is of the form $y = kx$, then we are sure it is proportional.

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Unit 2, Lesson 7
Practice Problems

1. Decide whether each table could represent a proportional relationship. If the relationship could be proportional, what would the constant of proportionality be?

   a. How loud a sound is depending on how far away you are.

distance to listener (ft)	sound level (dB)
5	85
10	79
20	73
40	67

   b. The cost of fountain drinks at Hot Dog Hut.

volume (fluid ounces)	cost ($)
16	$1.49
20	$1.59
30	$1.89

2. A taxi service charges $1.00 for the first $\frac{1}{10}$ mile then $0.10 for each additional $\frac{1}{10}$ mile after that.

   Fill in the table with the missing information then determine if this relationship between distance traveled and price of the trip is a proportional relationship.

distance traveled (mi)	price (dollars)
$\frac{9}{10}$	
2	
$3\frac{1}{10}$	
10	

3. A rabbit and turtle are in a race. Is the relationship between distance traveled and time proportional for either one? If so, write an equation that represents the relationship.

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Turtle's run:

distance (meters)	time (minutes)
108	2
405	7.5
540	10
1,768.5	32.75

Rabbit's run:

distance (meters)	time (minutes)
800	1
900	5
1,107.5	20
1,524	32.5

4. For each table, answer: What is the constant of proportionality?

a.

a	b
2	14
5	35
9	63
$\frac{1}{3}$	$\frac{7}{3}$

b.

a	b
3	360
5	600
8	960
12	1440

c.

a	b
75	3
200	8
1525	61
10	0.4

d.

a	b
4	10
6	15
22	55
3	$7\frac{1}{2}$

5. Kiran and Mai are standing at one corner of a rectangular field of grass looking at the diagonally opposite corner. Kiran says that if the field were twice as long and twice as wide, then it would be twice the distance to the far corner. Mai says that it would be more than twice as far, since the diagonal is even longer than the side lengths. Do you agree with either of them?

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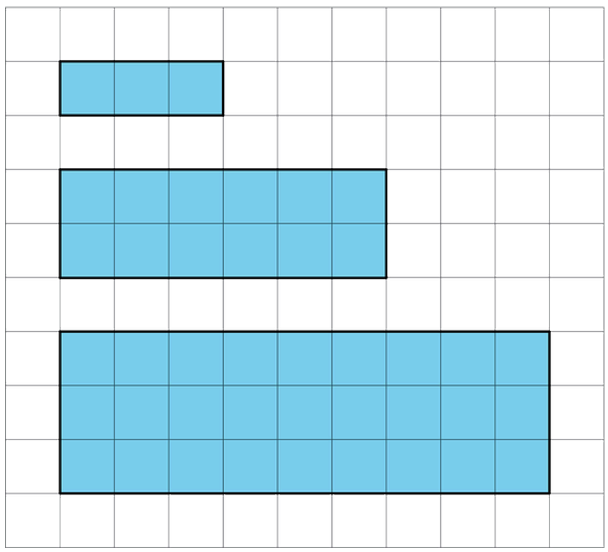
Unit 2, Lesson 8
Comparing Relationships with Equations

Let's develop methods for deciding if a relationship is proportional.

8.1 Notice and Wonder: Patterns with Rectangles



Do you see a pattern? What predictions can you make about future rectangles in the set if your pattern continues?

8.2 More Conversions

The other day you worked with converting meters, centimeters, and millimeters. Here are some more unit conversions.

1. Use the equation $F = \frac{9}{5}C + 32$, where F represents degrees Fahrenheit and C represents degrees Celsius, to complete the table.

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temperature $(^\circ\text{C})$	**temperature** $(^\circ\text{F})$
20	
4	
175	

2. Use the equation $c = 2.54n$, where c represents the length in centimeters and n represents the length in inches, to complete the table.

length (in)	**length (cm)**
10	
8	
$3\frac{1}{2}$	

3. Are these proportional relationships? Explain why or why not.

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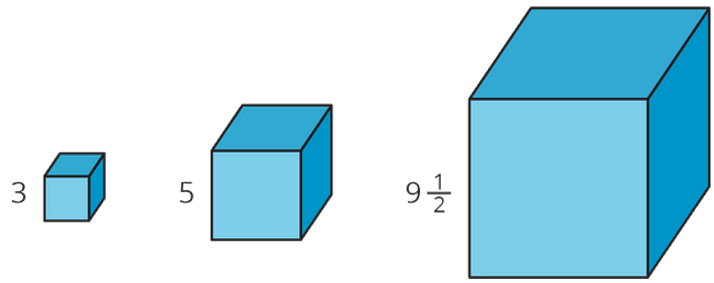
8.3 Total Edge Length, Surface Area, and Volume

Here are some cubes with different side lengths. Complete each table. Be prepared to explain your reasoning.



1. How long is the total edge length of each cube?

side length	**total edge length**
3	
5	
$9\frac{1}{2}$	
s	

2. What is the surface area of each cube?

side length	**surface area**
3	
5	
$9\frac{1}{2}$	
s	

3. What is the volume of each cube?

side length	**volume**
3	
5	
$9\frac{1}{2}$	
s	

4. Which of these relationships is proportional? Explain how you know.

5. Write equations for the total edge length E, total surface area A, and volume V of a cube with side length s.

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Are you ready for more?

1. A rectangular solid has a square base with side length ℓ, height 8, and volume V. Is the relationship between ℓ and V a proportional relationship?
2. A different rectangular solid has length ℓ, width 10, height 5, and volume V. Is the relationship between ℓ and V a proportional relationship?
3. Why is the relationship between the side length and the volume proportional in one situation and not the other?

8.4 All Kinds of Equations

Here are six different equations.

$y = 4 + x$	$y = 4x$	$y = \frac{4}{x}$
$y = \frac{x}{4}$	$y = 4^x$	$y = x^4$

1. Predict which of these equations represent a proportional relationship.
2. Complete each table using the equation that represents the relationship.

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$y = 4 + x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = 4x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = \frac{4}{x}$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = \frac{x}{4}$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = 4^x$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

$y = x^4$

x	y	$\frac{y}{x}$
2		
3		
4		
5		

3. Do these results change your answer to the first question? Explain your reasoning.

4. What do the equations of the proportional relationships have in common?

Lesson 8 Summary

If two quantities are in a proportional relationship, then their quotient is always the same. This table represents different values of a and b, two quantities that are in a proportional relationship.

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a	b	$\frac{b}{a}$
20	100	5
3	15	5
11	55	5
1	5	5

Notice that the quotient of b and a is always 5. To write this as an equation, we could say $\frac{b}{a} = 5$. If this is true, then $b = 5a$. (This doesn't work if $a = 0$, but it works otherwise.)

If quantity y is proportional to quantity x, we will always see this pattern: $\frac{y}{x}$ will always have the same value. This value is the constant of proportionality, which we often refer to as k. We can represent this relationship with the equation $\frac{y}{x} = k$ (as long as x is not 0) or $y = kx$.

Note that if an equation cannot be written in this form, then it does not represent a proportional relationship.

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Unit 2, Lesson 8
Practice Problems

1. The relationship between a distance in yards (y) and the same distance in miles (m) is described by the equation $y = 1760m$.

   a. Find measurements in yards and miles for distances by filling in the table.

distance measured in miles	**distance measured in yards**
1	
5	
	3,520
	17,600

   b. Is there a proportional relationship between a measurement in yards and a measurement in miles for the same distance? Explain why or why not.

2. Decide whether or not each equation represents a proportional relationship.

   a. The remaining length (L) of 120-inch rope after x inches have been cut off: $120 - x = L$

   b. The total cost (t) after 8% sales tax is added to an item's price (p): $1.08p = t$

   c. The number of marbles each sister gets (x) when m marbles are shared equally among four sisters: $x = \frac{m}{4}$

   d. The volume (V) of a rectangular prism whose height is 12 cm and base is a square with side lengths s cm: $V = 12s^2$

3. a. Use the equation $y = \frac{5}{2}x$ to fill in the table.

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Is y proportional to x and y? Explain why or why not.

x	y
2	
3	
6	

b. Use the equation $y = 3.2x + 5$ to fill in the table.
Is y proportional to x and y? Explain why or why not.

x	y
1	
2	
4	

4. To transmit information on the internet, large files are broken into packets of smaller sizes. Each packet has 1,500 bytes of information. An equation relating packets to bytes of information is given by $b = 1{,}500p$ where p represents the number of packets and b represents the number of bytes of information.

   a. How many packets would be needed to transmit 30,000 bytes of information?

   b. How much information could be transmitted in 30,000 packets?

   c. Each byte contains 8 bits of information. Write an equation to represent the relationship between the number of packets and the number of bits.

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Unit 2, Lesson 9
Solving Problems about Proportional Relationships

Let's solve problems about proportional relationships.

9.1 What Do You Want to Know?

Consider the problem: A person is running a distance race at a constant rate. What time will they finish the race?

What information would you need to be able to solve the problem?

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9.2 Info Gap: Biking and Rain

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the *problem card*:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need.
3. Explain to your partner how you are using the information to solve the problem.
4. Solve the problem and explain your reasoning to your partner.

If your teacher gives you the *data card*:

1. Silently read the information on your card.
2. Ask your partner "What specific information do you need?" and wait for your partner to *ask* for information. *Only* give information that is on your card. (Do not figure out anything for your partner!)
3. Before telling your partner the information, ask "Why do you need that information?"
4. After your partner solves the problem, ask them to explain their reasoning and listen to their explanation.

Pause here so your teacher can review your work. Ask your teacher for a new set of cards and repeat the activity, trading roles with your partner.

9.3 Moderating Comments

A company is hiring people to read through all the comments posted on their website to make sure they are appropriate. Four people applied for the job and were given one day to show how quickly they could check comments.

- Person 1 worked for 210 minutes and checked a total of 50,000 comments.

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- Person 2 worked for 200 minutes and checked 1,325 comments every 5 minutes.
- Person 3 worked for 120 minutes, at a rate represented by $c = 331t$, where c is the number of comments checked and t is the time in minutes.
- Person 4 worked for 150 minutes, at a rate represented by $t = \left(\frac{3}{800}\right) c$.

1. Order the people from greatest to least in terms of total number of comments checked.

2. Order the people from greatest to least in terms of how fast they checked the comments.

Are you ready for more?

1. Write equations for each job applicant that allow you to easily decide who is working the fastest.
2. Make a table that allows you to easily compare how many comments the four job applicants can check.

Lesson 9 Summary

Whenever we have a situation involving constant rates, we are likely to have a proportional relationship between quantities of interest.

- When a bird is flying at a constant speed, then there is a proportional relationship between the flying time and distance flown.
- If water is filling a tub at a constant rate, then there is a proportional relationship between the amount of water in the tub and the time the tub has been filling up.
- If an aardvark is eating termites at a constant rate, then there is proportional relationship between the number of termites the aardvark has eaten and the time since it started eating.

Sometimes we are presented with a situation, and it is not so clear whether a proportional relationship is a good model. How can we decide if a proportional relationship is a good representation of a particular situation?

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- If you aren't sure where to start, look at the quotients of corresponding values. If they are not always the same, then the relationship is definitely not a proportional relationship.
- If you can see that there is a single value that we always multiply one quantity by to get the other quantity, it is definitely a proportional relationship.

After establishing that it is a proportional relationship, setting up an equation is often the most efficient way to solve problems related to the situation.

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Unit 2, Lesson 9
Practice Problems

1. For each situation, explain whether you think the relationship is proportional or not. Explain your reasoning.

   a. The weight of a stack of standard 8.5x11 copier paper vs. number of sheets of paper.

   b. The weight of a stack of different-sized books vs. the number of books in the stack.

"Paper ream" by Bluesnap via Pixabay. Public Domain.

"Stack of books" by Hermann via Pixabay. Public Domain.

2. Every package of a certain toy also includes 2 batteries.

   a. Are the number of toys and number of batteries in a proportional relationship? If so, what are the two constants of proportionality? If not, explain your reasoning.

   b. Use t for the number of toys and b for the number of batteries to write two equations relating the two variables.

   $b =$ $t =$

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3. Lin and her brother were born on the same date in different years. Lin was 5 years old when her brother was 2.

   a. Find their ages in different years by filling in the table.

Lin's age	**Her brother's age**
5	2
6	
15	
	25

   b. Is there a proportional relationship between Lin's age and her brother's age? Explain your reasoning.

4. A student argues that $y = \frac{x}{9}$ does not represent a proportional relationship between x and y because we need to multiply one variable by the same constant to get the other one and not divide it by a constant. Do you agree or disagree with this student?

5. Quadrilateral A has side lengths 3, 4, 5, and 6. Quadrilateral B is a scaled copy of Quadrilateral A with a scale factor of 2. Select **all** of the following that are side lengths of Quadrilateral B.

   A. 5

   B. 6

   C. 7

   D. 8

   E. 9

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Unit 2, Lesson 10
Introducing Graphs of Proportional Relationships

Let's see how graphs of proportional relationships differ from graphs of other relationships.

10.1 Notice These Points

Interactive digital version available

a.openup.org/ms-math/en/s/ccss-7-2-10-1

1. Plot the points $(0, 10), (1, 8), (2, 6), (3, 4), (4, 2)$.

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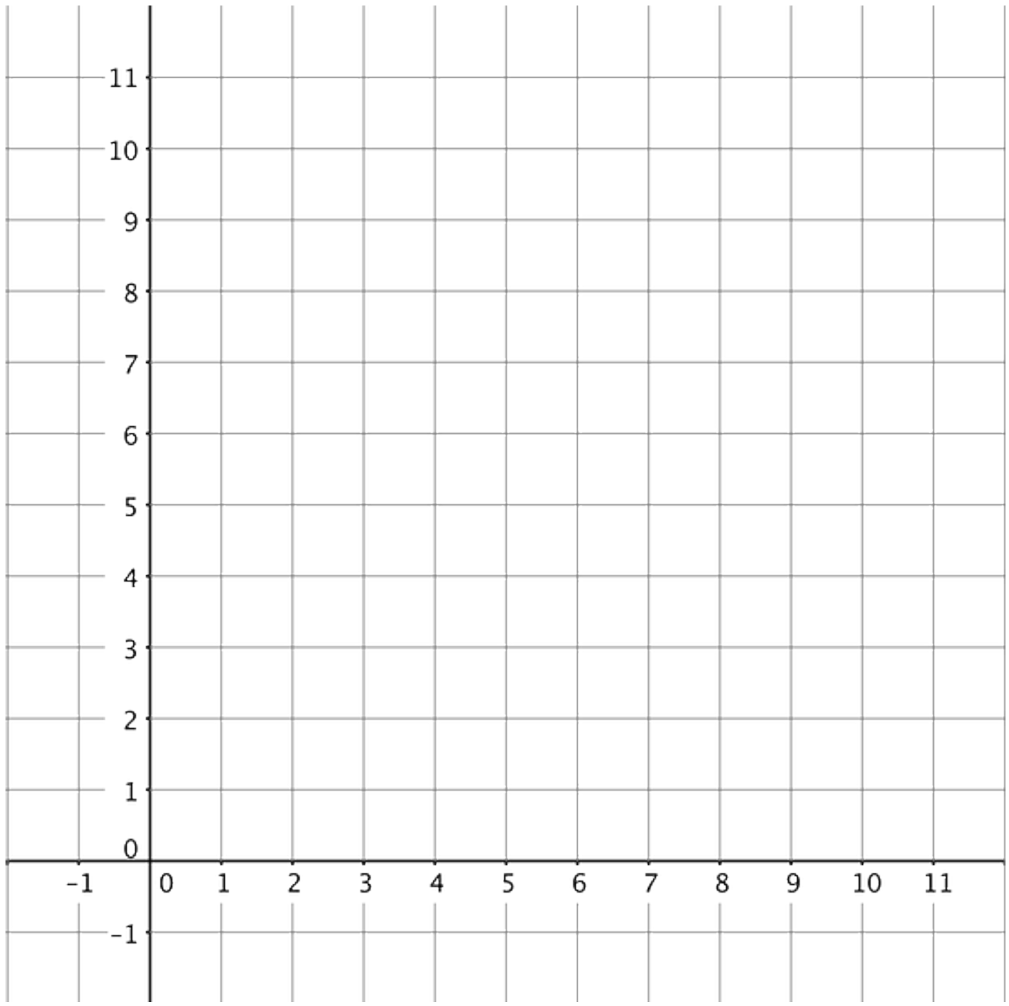

2. What do you notice about the graph?

10.2 T-shirts for Sale

Interactive digital version available

a.openup.org/ms-math/en/s/ccss-7-2-10-2

Some T-shirts cost $8 each.

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1. Use the table to answer these questions.

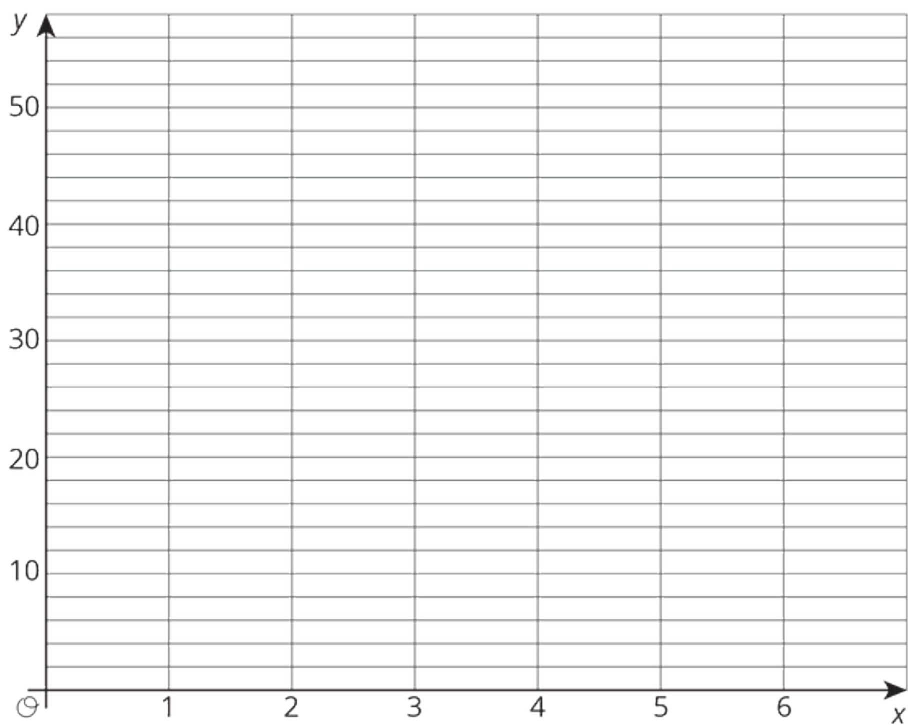
x	y
1	8
2	16
3	24
4	32
5	40
6	48

   a. What does x represent?

   b. What does y represent?

   c. Is there a proportional relationship between x and y?

2. Plot the pairs in the table on the coordinate plane.



3. What do you notice about the graph?

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10.3 Matching Tables and Graphs

Your teacher will give you papers showing tables and graphs.

1. Examine the graphs closely. What is the same and what is different about the graphs?

2. Sort the graphs into categories of your choosing. Label each category. Be prepared to explain why you sorted the graphs the way you did.

3. Take turns with a partner to match a table with a graph.

    a. For each match you find, explain to your partner how you know it is a match.

    b. For each match your partner finds, listen carefully to their explanation. If you disagree, work to reach an agreement.

    Pause here so your teacher can review your work.

4. Trade places with another group. How are their categories the same as your group's categories? How are they different?

5. Return to your original place. Discuss any changes you may wish to make to your categories based on what the other group did.

6. Which of the relationships are proportional?

7. What have you noticed about the graphs of proportional relationships? Do you think this will hold true for *all* graphs of proportional relationships?

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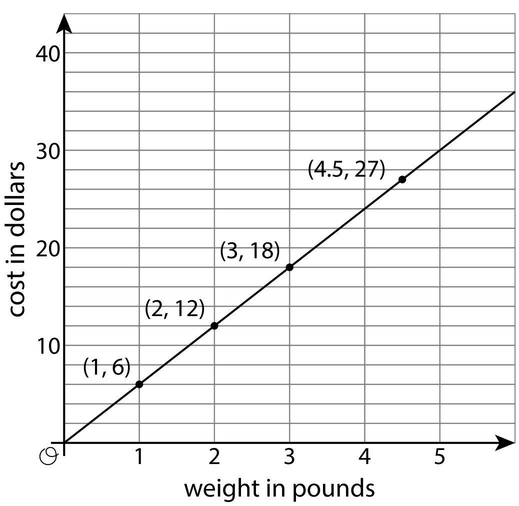
Are you ready for more?

1. All the graphs in this activity show points where both coordinates are positive. Would it make sense for any of them to have one or more coordinates that are negative?

2. The equation of a proportional relationship is of the form $y = kx$, where k is a positive number, and the graph is a line through $(0, 0)$. What would the graph look like if k were a negative number?

Lesson 10 Summary

One way to represent a proportional relationship is with a graph. Here is a graph that represents different amounts that fit the situation, "Blueberries cost $6 per pound."



Different points on the graph tell us, for example, that 2 pounds of blueberries cost $12, and 4.5 pounds of blueberries cost $27.

Sometimes it makes sense to connect the points with a line, and sometimes it doesn't. We could buy, for example, 4.5 pounds of blueberries or 1.875 pounds of blueberries, so all the points in between the whole numbers make sense in the situation, so any point on the line is meaningful.

If the graph represented the cost for different *numbers of sandwiches* (instead of pounds of blueberries), it might not make sense to connect the points with a line, because it is often not possible to buy 4.5 sandwiches or 1.875 sandwiches. Even if only points make sense in the situation, though, sometimes we connect them with a line anyway to make the relationship easier to see.

Graphs that represent proportional relationships all have a few things in common:

- Points that satisfy the relationship lie on a straight line.
- The line that they lie on passes through the **origin**, $(0, 0)$.

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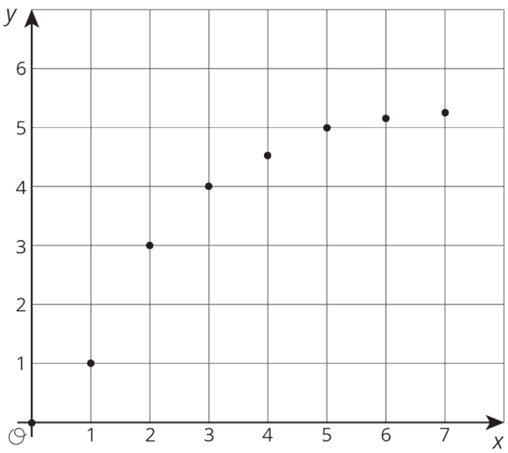
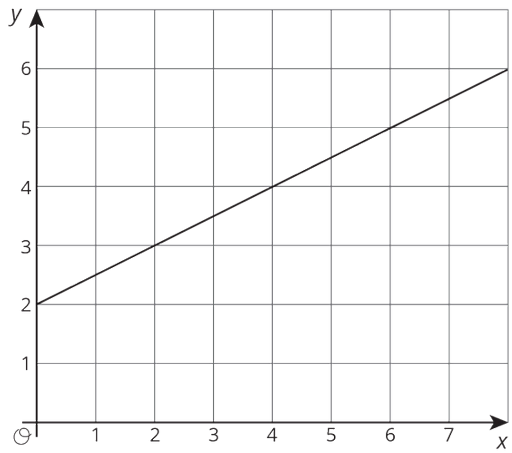
Here are some graphs that do *not* represent proportional relationships:



These points do not lie on a line.



This is a line, but it doesn't go through the origin.

Glossary Terms

origin

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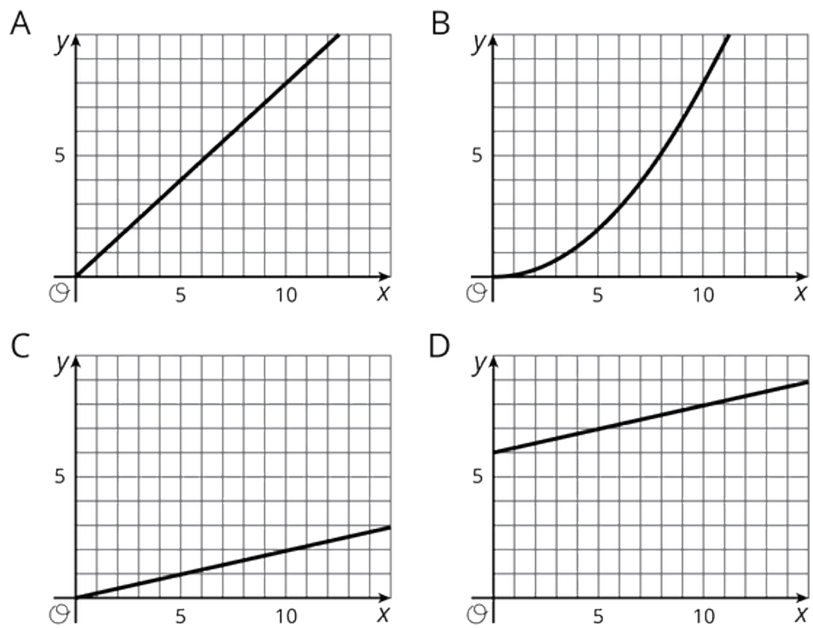
Unit 2, Lesson 10
Practice Problems

1. Which graphs could represent a proportional relationship? Explain how you decided.



2. A lemonade recipe calls for $\frac{1}{4}$ cup of lemon juice for every cup of water.

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a. Use the table to answer these questions.
   i. What does x represent?
   ii. What does y represent?
   iii. Is there a proportional relationship between x and y?

b. Plot the pairs in the table in a coordinate plane.

x	y
1	$\frac{1}{4}$
2	$\frac{1}{2}$
3	$\frac{3}{4}$
4	1
5	$1\frac{1}{4}$
6	$1\frac{1}{2}$

3. Decide whether each table could represent a proportional relationship. If the relationship could be proportional, what would be the constant of proportionality?

   a. The sizes you can print a photo:

width of photo (inches)	**height of photo (inches)**
2	3
4	6
5	7
8	10

   b. The distance from which a lighthouse is visible:

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height of a lighthouse (feet)	distance it can be seen (miles)
20	6
45	9
70	11
95	13
150	16

4. Select **all** of the pieces of information that would tell you x and y have a proportional relationship. Let y represent the distance between a rock and a turtle's current position in meters and x represent the number of minutes the turtle has been moving.

   A. $y = 3x$

   B. After 4 minutes, the turtle has walked 12 feet away from the rock.

   C. The turtle walks for a bit, then stops for a minute before walking again.

   D. The turtle walks away from the rock at a constant rate.

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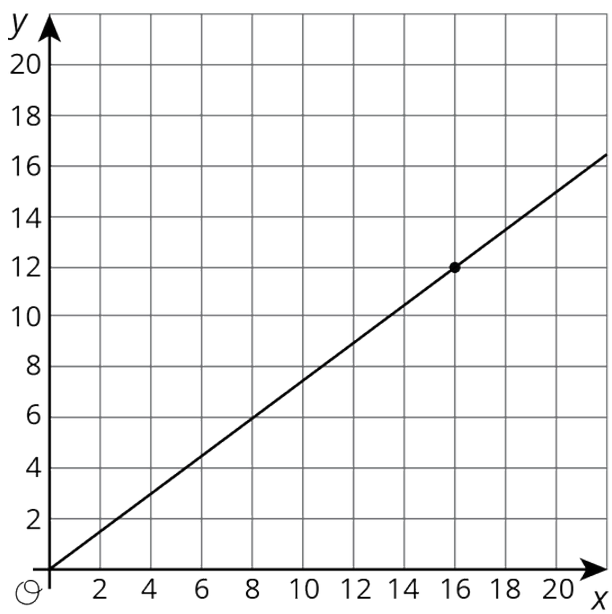
Unit 2, Lesson 11

Interpreting Graphs of Proportional Relationships

Let's read stories from the graphs of proportional relationships.

11.1 What Could the Graph Represent?

Here is a graph that represents a proportional relationship.



1. Invent a situation that could be represented by this graph.

2. Label the axes with the quantities in your situation.

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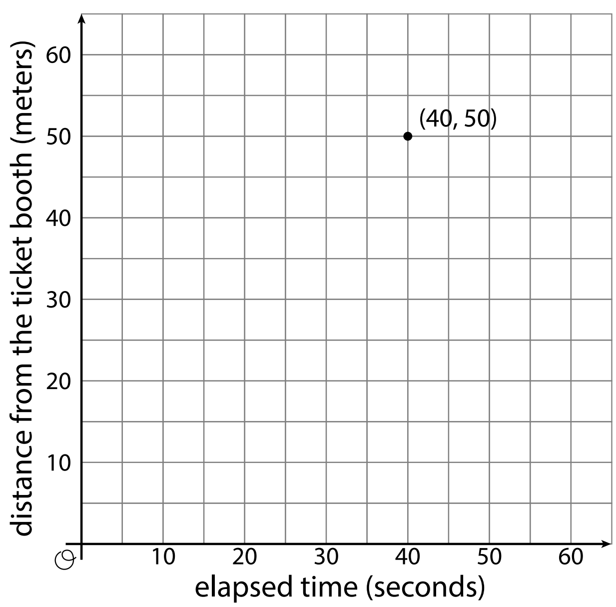
3. Give the graph a title.

4. There is a point on the graph. What are its coordinates? What does it represent in your situation?

11.2 Tyler's Walk

Tyler was at the amusement park. He walked at a steady pace from the ticket booth to the bumper cars.

1. The point on the graph shows his arrival at the bumper cars. What do the coordinates of the point tell us about the situation?



2. The table representing Tyler's walk shows other values of time and distance. Complete the table. Next, plot the pairs of values on the grid.

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time (seconds)	distance (meters)
0	0
20	25
30	37.5
40	50
1	

3. What does the point $(0, 0)$ mean in this situation?

4. How far away from the ticket booth was Tyler after 1 second? Label the point on the graph that shows this information with its coordinates.

5. What is the constant of proportionality for the relationship between time and distance? What does it tell you about Tyler's walk? Where do you see it in the graph?

Are you ready for more?

If Tyler wanted to get to the bumper cars in half the time, how would the graph representing his walk change? How would the table change? What about the constant of proportionality?

11.3 Seagulls Eat What?

Interactive digital version available

a.openup.org/ms-math/en/s/ccss-7-2-11-3

4 seagulls ate 10 pounds of garbage. Assume this information describes a proportional relationship.

1. Plot a point that shows the number of seagulls and the amount of garbage they ate.

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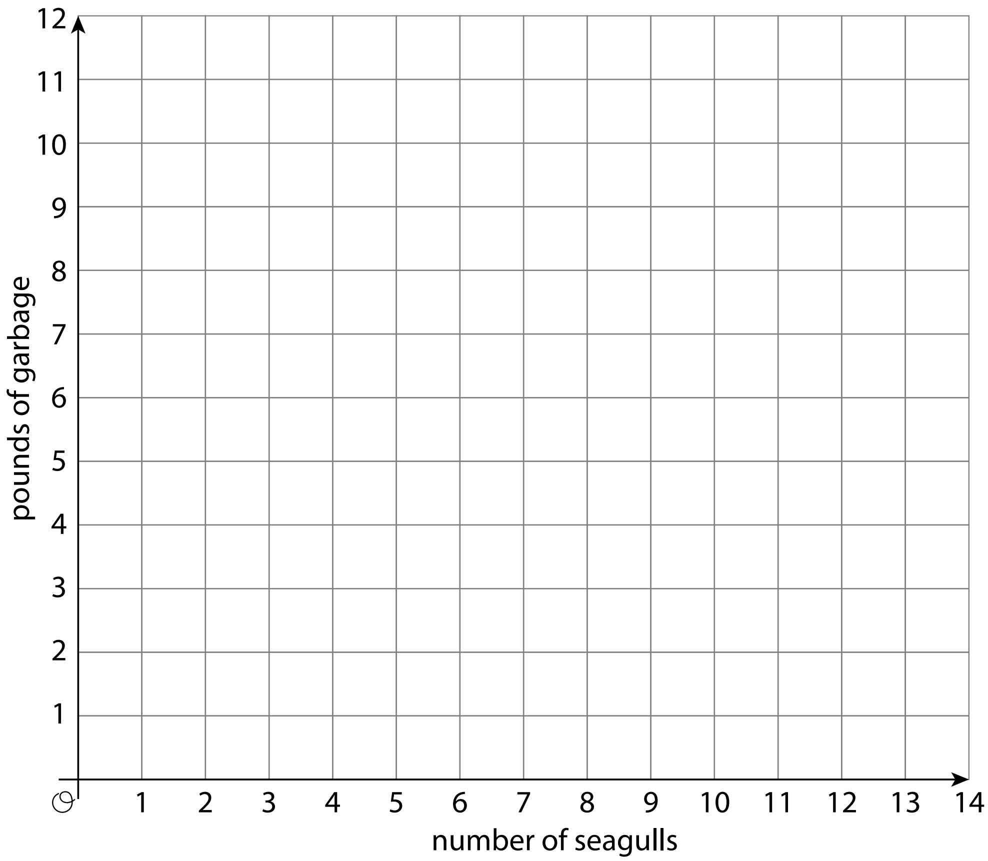
2. Use a straight edge to draw a line through this point and $(0, 0)$.

3. Plot the point $(1, k)$ on the line. What is the value of k? What does the value of k tell you about this context?



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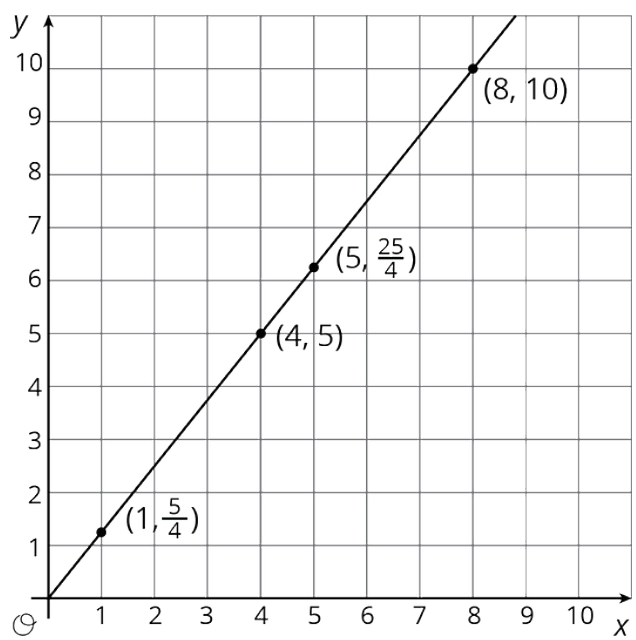
Lesson 11 Summary

For the relationship represented in this table, y is proportional to x. We can see in the table that $\frac{5}{4}$ is the constant of proportionality because it's the y value when x is 1.

The equation $y = \frac{5}{4}x$ also represents this relationship.

x	y
4	5
5	$\frac{25}{4}$
8	10
1	$\frac{5}{4}$

Here is the graph of this relationship.



If y represents the distance in feet that a snail crawls in x minutes, then the point $(4, 5)$ tells us that the snail can crawl 5 feet in 4 minutes.

If y represents the cups of yogurt and x represents the teaspoons of cinnamon in a recipe for fruit dip, then the point $(4, 5)$ tells us that you can mix 4 teaspoons of cinnamon with 5 cups of yogurt to make this fruit dip.

We can find the constant of proportionality by looking at the graph, because $\frac{5}{4}$ is the y -coordinate of the point on the graph where the x-coordinate is 1. This could mean the snail is traveling $\frac{5}{4}$ feet per minute or that the recipe calls for $1\frac{1}{4}$ cups of yogurt for every teaspoon of cinnamon.

In general, when y is proportional to x, the corresponding constant of proportionality is the y-value when $x = 1$.

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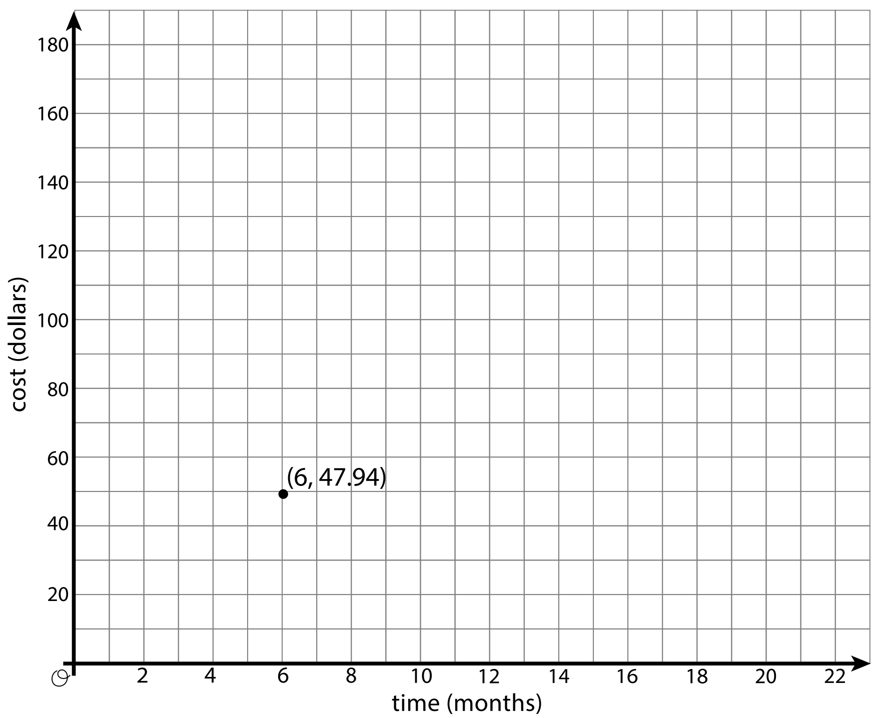
Unit 2, Lesson 11
Practice Problems

1. There is a proportional relationship between the number of months a person has had a streaming movie subscription and the total amount of money they have paid for the subscription. The cost for 6 months is $47.94. The point $(6, 47.94)$ is shown on the graph below.



   a. What is the constant of proportionality in this relationship?
   b. What does the constant of proportionality tell us about the situation?
   c. Add at least three more points to the graph and label them with their coordinates.
   d. Write an equation that represents the relationship between C, the total cost of the subscription, and m, the number of months.

2. The graph shows the amounts of almonds, in grams, for different amounts of oats, in cups, in a granola mix. Label the point $(1, k)$ on the graph, find the value of k, and explain its meaning.

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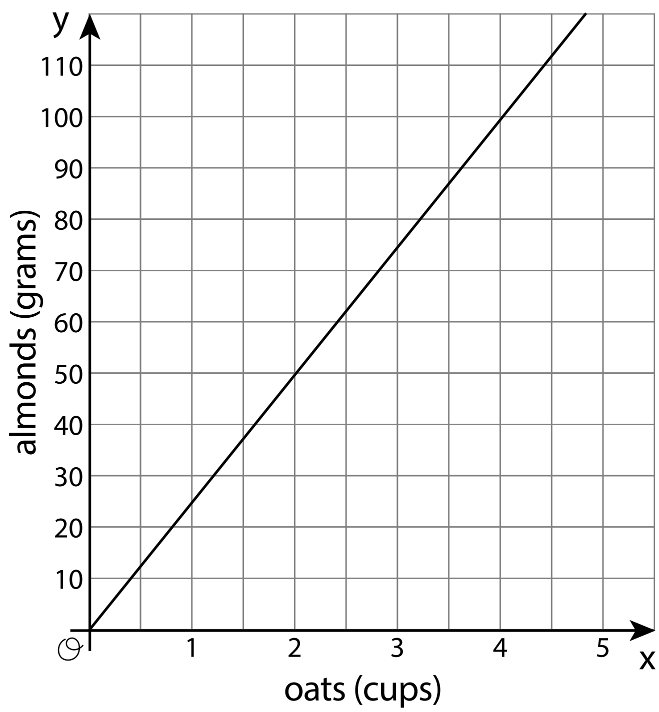

3. To make a friendship bracelet, some long strings are lined up; then, one string is tied in a knot with each of the other strings to create a row of knots. A new string is chosen and knotted with the all the other strings to create a second row. This process is repeated until there are enough rows to make a bracelet to fit around your friend's wrist.

   Are the number of knots proportional to the number of rows? Explain your reasoning.

4. What information do you need to know to write an equation relating two quantities that have a proportional relationship?