6th Grade Math Week 2

Dear Parent/Guardian,

During Week 2, we will review and support standards mastery of Ratios and Proportional Reasoning. Your child will use ratio and rate reasoning to solve real-world and mathematical problems by making and using tables, equivalent ratios, tape diagrams, double number lines and equations. They will also use tables to compare ratios. The table below lists this week's tasks and practice problems. 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 11 - Representing Ratios with Tables		
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	Practice Problems		
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Unit 2, Lesson 11 **Representing Ratios with Tables**

Let's use tables to represent equivalent ratios.

11.1 How Is It Growing?

Look for a pattern in the figures.

- 1. How many total tiles will be in:
 - a. the 4th figure?
 - b. the 5th figure?



2. How do you see it growing?



11.2 A Huge Amount of Sparkling Orange Juice

Interactive digital version available

a.openup.org/ms-math/en/s/ccss-6-2-11-2



Noah's recipe for one batch of sparkling orange juice uses 4 liters of orange juice and 5 liters of soda water.

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1. Use the double number line to show how many liter different-sized batches of sparkling orange juice.	rs of each ingredient to	o use for
orange juice (liters) ++++++++++++++++++++++++++++++++++++	+ + + +	-++>
soda water (liters) 🛛 🕂 👘 👘 👘	+ + + +	-++

- 2. If someone mixes 36 liters of orange juice and 45 liters of soda water, how many batches would they make?
- 3. If someone uses 400 liters of orange juice, how much soda water would they need?
- 4. If someone uses 455 liters of soda water, how much orange juice would they need?
- 5. Explain the trouble with using a double number line diagram to answer the last two questions.

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11.3 Batches of Trail Mix

A recipe for trail mix says: "Mix 7 ounces of almonds with 5 ounces of raisins." Here is a **table** that has been started to show how many ounces of almonds and raisins would be in different-sized batches of this trail mix.

almonds (oz)	raisins (oz)
7	5
28	
	10
3.5	
	250
56	

1. Complete the table so that ratios represented by each row are equivalent.

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- 2. What methods did you use to fill in the table?
- 3. How do you know that each row shows a ratio that is equivalent to 7 : 5? Explain your reasoning.

➡ Are you ready for more?

You have created a best-selling recipe for chocolate chip cookies. The ratio of sugar to flour is 2:5.

Create a table in which each entry represents amounts of sugar and flour that might be used at the same time in your recipe.

- One entry should have amounts where you have fewer than 25 cups of flour.
- One entry should have amounts where you have between 20–30 cups of sugar.
- One entry can have any amounts using more than 500 units of flour.

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Lesson 11 Summary

A **table** is a way to organize information. Each horizontal set of entries is called a *row*, and each vertical set of entries is called a *column*. (The table shown has 2 columns and 5 rows.) A table can be used to represent a collection of equivalent ratios.

Here is a double number line diagram and a table that both represent the situation: "The price is \$2 for every 3 mangos."



Glossary Terms

table

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Unit 2, Lesson 11 **Practice Problems**

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1. Complete the table to show the amounts of yellow and red paint needed for differentsized batches of the same shade of orange paint.

yellow paint (quarts)	red paint (quarts)
5	6

Explain how you know that these amounts of yellow paint and red paint will make the same shade of orange as the mixture in the first row of the table.

2. A car travels at a constant speed, as shown on the double number line.

time (hours)	0	1	2	3
distance (kilometers)		1		
distance (kilometers)	Ó	70	140	210

How far does the car travel in 14 hours? Explain or show your reasoning.

3. The olive trees in an orchard produce 3,000 pounds of olives a year. It takes 20 pounds of olives to make 3 liters of olive oil. How many liters of olive oil can this orchard produce in a year? If you get stuck, consider using the table.

olives (pounds)	olive oil (liters)
20	3
100	
3,000	

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4. At a school recess, there needs to be a ratio o playground. The double number line represe the playground at recess.	f 2 adults for every 2 nts the number of a	24 children on the dults and children on
number of adults $\frac{0 2}{+ + + + + + + + + + $	a. Label each rema value.	aining tick mark with its

number of children -	0	24		96

- b. How many adults are needed if there are 72 children? Circle your answer on the double number line.
- 5. While playing basketball, Jada's heart rate goes up to 160 beats per minute. While jogging, her heart beats 25 times in 10 seconds. Assuming her heart beats at a constant rate while jogging, which of these activities resulted in a higher heart rate? Explain your reasoning.
- 6. A shopper bought the following items at the farmer's market:
 - a. 6 ears of corn for \$1.80. What was the cost per ear?
 - b. 12 apples for \$2.88. What was the cost per apple?
 - c. 5 tomatoes for \$3.10. What was the cost per tomato?

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Unit 2, Lesson 12 Navigating a Table of Equivalent Ratios

Let's use a table of equivalent ratios like a pro.

12.1 Number Talk: Multiplying by a Unit Fraction

Find the product mentally.

 $\frac{\frac{1}{3} \cdot 21}{\frac{1}{6} \cdot 21}$ $(5.6) \cdot \frac{1}{8}$ $\frac{1}{4} \cdot (5.6)$

12.2 Comparing Taco Prices

number of tacos	price in dollars

Use the table to help you solve these problems. Explain or show your reasoning.

- 1. Noah bought 4 tacos and paid \$6. At this rate, how many tacos could he buy for \$15?
- 2. Jada's family bought 50 tacos for a party and paid \$72. Were Jada's tacos the same price as Noah's tacos?

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12.3 Hourly Wages

Lin is paid \$90 for 5 hours of work. She used the following table to calculate how much she would be paid at this rate for 8 hours of work.

	amount earned (\$)	time worked (hours)	
<u>1</u>	90	5	$-\frac{1}{5}$
5	18	1	
•8	144	8)•8

- 1. What is the meaning of the 18 that appears in the table?
- 3. Explain how Lin used this table to solve the problem.

- 2. Why was the number $\frac{1}{5}$ used as a multiplier?
- 4. At this rate, how much would Lin be paid for 3 hours of work? For 2.1 hours of work?

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12.4 Zeno's Memory Card

In 2016, 128 gigabytes (GB) of portable computer memory cost \$32.

1. Here is a double number line that represents the situation:



One set of tick marks has already been drawn to show the result of multiplying 128 and 32 each by $\frac{1}{2}$. Label the amount of memory and the cost for these tick marks.

Next, keep multiplying by $\frac{1}{2}$ and drawing and labeling new tick marks, until you can no longer clearly label each new tick mark with a number.

2. Here is a table that represents the situation. Find the cost of 1 gigabyte. You can use as many rows as you need.

memory (gigabytes)	cost (dollars)
128	32

3. Did you prefer the double number line or the table for solving this problem? Why?

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🔶 Are you r	ready for mo	ore?		
A kilometer is 1,00 means 1,000,000 a memory needed t following would fi	00 meters becaus and <i>giga</i> (as in gi o store one lette t on a 1-gigabyte	se <i>kilo</i> is a prefix that gabyte) means 1,000 r of the alphabet. Ab e flash drive?	t means 1,000. Th 0,000,000. One by pout how many o	ie prefix <i>mega</i> /te is the amount of f each of the
1. letters	2. pages	3. books	4. movies	5. songs

Lesson 12 Summary

Finding a row containing a "1" is often a good way to work with tables of equivalent ratios. For example, the price for 4 lbs of granola is \$5. At that rate, what would be the price for 62 lbs of granola?

Here are tables showing two different approaches to solving this problem. Both of these approaches are correct. However, one approach is more efficient.

• Less efficient

	granola (lbs)	price (\$)	
20	4	5	
	8	10	$\leq \frac{1}{2}$
~ ~	16	20	$\boldsymbol{\boldsymbol{<}}^{2}$
•2	32	40	\checkmark ²
•2	64	80	$\mathbf{\mathbf{x}}^{\cdot 2}$
-2 IDS	62	77.50	▲ -\$2.50

• More efficient

	granola (lbs)	price (\$)	
1	4	5	
	1	1.25	
•02	62	77.50	▲ •62

Notice how the more efficient approach starts by finding the price for 1 lb of granola.

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Remember that dividing by a whole number is the same as multiplying by a unit fraction. In this example, we can divide by 4 or multiply by $\frac{1}{4}$ to find the unit price. DATE

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Unit 2, Lesson 12 **Practice Problems**

1. Priya collected 2,400 grams of pennies in a fundraiser. Each penny has a mass of 2.5 grams. How much money did Priya raise? If you get stuck, consider using the table.

number of pennies	mass in grams
1	2.5
	2,400

2. Kiran reads 5 pages in 20 minutes. He spends the same amount of time per page. How long will it take him to read 11 pages? If you get stuck, consider using the table.

time in minutes	number of pages
20	5
	1
	11

3. Mai is making personal pizzas. For 4 pizzas, she uses 10 ounces of cheese.

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ſ	number of pizzas	ounces of cheese	a. How mu	ch cheese does Mai use
	4	10	per pizza?	
-			b. At this ra will she nee	ite, how much cheese ed to make 15 pizzas?

- 4. Clare is paid \$90 for 5 hours of work. At this rate, how many seconds does it take for her to earn 25 cents?
- 5. A car that travels 20 miles in $\frac{1}{2}$ hour at constant speed is traveling at the same speed as a car that travels 30 miles in $\frac{3}{4}$ hour at a constant speed. Explain or show why.
- 6. Lin makes her favorite juice blend by mixing cranberry juice with apple juice in the ratio shown on the double number line. Complete the diagram to show smaller and larger batches that would taste the same as Lin's favorite blend.

cranberry juice (fluid ounces)
$$\begin{array}{c|c} 0 & 9 \\ + & + & + \end{array}$$

apple juice (fluid ounces) +++++++

- 7. Each of these is a pair of equivalent ratios. For each pair, explain why they are equivalent ratios or draw a representation that shows why they are equivalent ratios.
 - a. 600:450 and 60:45
 - b. 60:45 and 4:3
 - c. 600:450 and 4:3

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Unit 2, Lesson 13 Tables and Double Number Line Diagrams

Let's contrast double number lines and tables.

13.1 Number Talk: Constant Dividend

- 1. Find the quotients mentally.
 - $150 \div 2$
 - $150 \div 4$
 - $150 \div 8$
- 2. Locate and label the quotients on the number line.



13.2 Moving 3,000 Meters

The other day, we saw that Han can run 100 meters in 20 seconds.

Han wonders how long it would take him to run 3,000 meters at this rate. He made a table of equivalent ratios.

1. Do you agree that this table represents the situation? Explain your reasoning.

20	100
10	50
1	5
3,000	



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- 2. Complete the last row with the missing number.
- 3. What question about the situation does this number answer?
- 4. What could Han do to improve his table?
- 5. Priya can bike 150 meters in 20 seconds. At this rate, how long would it take her to bike 3,000 meters?
- 6. Priya's neighbor has a dirt bike that can go 360 meters in 15 seconds. At this rate, how long would it take them to ride 3,000 meters?

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13.3 The International Space Station

The International Space Station orbits around the Earth at a constant speed. Your teacher will give you either a double number line or a table that represents this situation. Your partner will get the other representation.

- 1. Complete the parts of your representation that you can figure out for sure.
- 2. Share information with your partner, and use the information that your partner shares to complete your representation.



"International Space Station" by NASA via <u>NASA</u>. Public Domain.

- 3. What is the speed of the International Space Station?
- 4. Place the two completed representations side by side. Discuss with your partner some ways in which they are the same and some ways in which they are different.
- 5. Record at least one way that they are the same and one way they are different.

➡ Are you ready for more?

The Earth's circumference is about 40,000 kilometers and the orbit of the International Space Station is just a bit more than this. About how long does it take for the International Space Station to orbit the Earth?

Lesson 13 Summary

On a double number line diagram, we put labels in front of each line to tell what the numbers represent. On a table, we put labels at the top of each column to tell what the numbers represent.



Both double number lines and tables can help us use multiplication to make equivalent ratios, but there is an important difference between the two representations.

On a double number line, the numbers on each line are listed in order. With a table, you can write the ratios in any order. For this reason, sometimes a table is easier to use to solve a problem.

For example, what if we wanted to know how far the snail travels in 10 minutes? Notice that 60 centimeters in 10 minutes is shown on the table, but there is not enough room for this information on the double number line.

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Unit 2, Lesson 13 **Practice Problems**

1. The double number line shows how much water and how much lemonade powder to mix to make different amounts of lemonade.



Make a table that represents the same situation.

- 2. A bread recipe uses 3 tablespoons of olive oil for every 2 cloves of crushed garlic.
 - a. Complete the table to show differentsized batches of bread that taste the same as the recipe.
 - b. Draw a double number line that represents the same situation.
 - c. Which representation do you think works better in this situation? Explain why.

olive oil (tablespoons)	crushed garlic (cloves)
3	2
1	
2	
5	
10	

3. Clare travels at a constant speed, as shown on the double number line.

distance (miles)	0	72	144	216
alansed time (hours)		1	1	
elapsed time (nours)	0	2	4	6

At this rate, how far does she travel in each of these intervals of time? Explain or show your reasoning. If you get stuck, consider using a table.

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- a. 1 hour
- b. 3 hours
- c. 6.5 hours
- 4. Lin and Diego travel in cars on the highway at constant speeds. In each case, decide who was traveling faster and explain how you know.
 - a. During the first half hour, Lin travels 23 miles while Diego travels 25 miles.
 - b. After stopping for lunch, they travel at different speeds. To travel the next 60 miles, it takes Lin 65 minutes and it takes Diego 70 minutes.
- 5. A sports drink recipe calls for $\frac{5}{3}$ tablespoons of powdered drink mix for every 12 ounces of water. How many batches can you make with 5 tablespoons of drink mix and 36 ounces of water? Explain your reasoning.
- 6. In this cube, each small square has side length 1 unit.
 - a. What is the surface area of this cube?
 - b. What is the volume of this cube?



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Unit 2, Lesson 14 Solving Equivalent Ratio Problems

Let's practice getting information from our partner.

14.1 What Do You Want to Know?

Here is a problem: A red car and a blue car enter the highway at the same time and travel at a constant speed. How far apart are they after 4 hours?

What information would you need to solve the problem?

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14.2 Info Gap: Hot Chocolate and Potatoes

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:

- Read your card silently and think about what you need to know to be able to answer the questions.
- 2. Ask your partner for the specific information that you need.
- 3. Explain how you are using the information to solve the problem.
- 4. Solve the problem and show your reasoning to your partner.

If your teacher gives you the *data card*:

- 1. Read your card silently.
- 2. Ask your partner *"What specific information do you need?"* and wait for them to *ask* for information.

If your partner asks for information that is not on the card, do not do the calculations for them. Tell them you don't have that information.

- 3. Have them explain *"Why do you need that information?"* before telling them the information.
- 4. After your partner solves the problem, ask them to explain their reasoning, even if you understand what they have done.

Both you and your partner should record a solution to each problem.

14.3 Comparing Reading Rates

- Lin read the first 54 pages from a 270-page book in the last 3 days.
- Diego read the first 100 pages from a 320-page book in the last 4 days.
- Elena read the first 160 pages from a 480-page book in the last 5 days.

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If they continue to read every day at these rates, who will finish first, second, and third? Explain or show your reasoning.

♣ Are you ready for more?

The ratio of cats to dogs in a room is 2:3. Five more cats enter the room, and then the ratio of cats to dogs is 9:11. How many cats and dogs were in the room to begin with?

Lesson 14 Summary

To solve problems about something happening at the same rate, we often need:

- Two pieces of information that allow us to write a ratio that describes the situation.
- A third piece of information that gives us one number of an equivalent ratio. Solving the problem often involves finding the other number in the equivalent ratio.

Suppose we are making a large batch of fizzy juice and the recipe says, "Mix 5 cups of cranberry juice with 2 cups of soda water." We know that the ratio of cranberry juice to soda water is 5:2, and that we need 2.5 cups of cranberry juice per cup of soda water.

We still need to know something about the size of the large batch. If we use 16 cups of soda water, what number goes with 16 to make a ratio that is equivalent to 5:2?

To make this large batch taste the same as the original recipe, we would need to use 40 cups of cranberry juice.

cranberry juice (cups)	soda water (cups)
5	2
2.5	1
40	16

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Unit 2, Lesson 14 **Practice Problems**

- 1. A chef is making pickles. He needs 15 gallons of vinegar. The store sells 2 gallons of vinegar for \$3.00 and allows customers to buy any amount of vinegar. Decide whether each of the following ratios correctly represents the price of vinegar.
 - a. 4 gallons to \$3.00
 - b. 1 gallon to \$1.50
 - c. 30 gallons to \$45.00
 - d. \$2.00 to 30 gallons
 - e. \$1.00 to $\frac{2}{3}$ gallon
- 2. A caterer needs to buy 21 pounds of pasta to cater a wedding. At a local store, 8 pounds of pasta cost \$12. How much will the caterer pay for the pasta there?
 - a. Write a ratio for the given information about the cost of pasta.
 - b. Would it be more helpful to write an equivalent ratio with 1 pound of pasta as one of the numbers, or with \$1 as one of the numbers? Explain your reasoning, and then write that equivalent ratio.
 - c. Find the answer and explain or show your reasoning.
- 3. Lin is reading a 47-page book. She read the first 20 pages in 35 minutes.
 - a. If she continues to read at the same rate, will she be able to complete this book in under 1 hour?
 - b. If so, how much time will she have left? If not, how much more time is needed? Explain or show your reasoning.
- 4. Diego can type 140 words in 4 minutes.

NAMEDATEPERIODa. At this rate, how long will it take him to type 385 words?b. How many words can he type in 15 minutes?

If you get stuck, consider creating a table.

- 5. A train that travels 30 miles in $\frac{1}{3}$ hour at a constant speed is going faster than a train that travels 20 miles in $\frac{1}{2}$ hour at a constant speed. Explain or show why.
- 6. Find the surface area of the polyhedron that can be assembled from this net. Show your reasoning.



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Unit 2, Lesson 15 Part-Part-Whole Ratios

Let's look at situations where you can add the quantities in a ratio together.

15.1 True or False: Multiplying by a Unit Fraction

True or false?

 $\frac{1}{5} \cdot 45 = \frac{45}{5}$ $\frac{1}{5} \cdot 20 = \frac{1}{4} \cdot 24$ $42 \cdot \frac{1}{6} = \frac{1}{6} \cdot 42$ $486 \cdot \frac{1}{12} = \frac{480}{12} + \frac{6}{12}$

15.2 Cubes of Paint

A recipe for maroon paint says, "Mix 5 ml of red paint with 3 ml of blue paint."

- 1. Use snap cubes to represent the amounts of red and blue paint in the recipe. Then, draw a sketch of your snap-cube representation of the maroon paint.
 - a. What amount does each cube represent?
 - b. How many milliliters of maroon paint will there be?

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2.	a.	Suppose eac	h cube represen	ts 2 ml. How mu	ch of each co	lor paint is t	here?
		Red:	_ ml	Blue: r	nl	Maroon:	ml
	b.	Suppose eac	h cube represen	ts 5 ml. How mu	ch of each co	lor paint is t	here?
		Red:	ml	Blue: r	nl	Maroon:	ml
3.	a.	Suppose you mix? Be prep	need 80 ml of m ared to explain y	naroon paint. Ho /our reasoning.	ow much red a	and blue pair	nt would you
		Red:	ml	Blue: r	nl	Maroon: 80	ml

b. If the original recipe is for one batch of maroon paint, how many batches are in 80 ml of maroon paint?

15.3 Sneakers, Chicken, and Fruit Juice

Solve each of the following problems and show your thinking. If you get stuck, consider drawing a **tape diagram** to represent the situation.

1. The ratio of students wearing sneakers to those wearing boots is 5 to 6. If there are 33 students in the class, and all of them are wearing either sneakers or boots, how many of them are wearing sneakers?

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2. A recipe for chicken marinade says, "Mix 3 parts oil with 2 parts soy sauce and 1 part orange juice." If you need 42 cups of marinade in all, how much of each ingredient should you use?

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3. Elena makes fruit punch by mixing 4 parts cranberry juice to 3 parts apple juice to 2 parts grape juice. If one batch of fruit punch includes 30 cups of apple juice, how large is this batch of fruit punch?

♣ Are you ready for more?

Using the recipe from earlier, how much fruit punch can you make if you have 50 cups of cranberry juice, 40 cups of apple juice, and 30 cups of grape juice?

15.4 Invent Your Own Ratio Problem

1. Invent another ratio problem that can be solved with a tape diagram and solve it. If you get stuck, consider looking back at the problems you solved in the earlier activity.

- 2. Create a visual display that includes:
 - The new problem that you wrote, without the solution.

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- Enough work space for someone to show a solution.
- 3. Trade your display with another group, and solve each other's problem. Include a tape diagram as part of your solution. Be prepared to share the solution with the class.
- 4. When the solution to the problem you invented is being shared by another group, check their answer for accuracy.

Lesson 15 Summary

A **tape diagram** is another way to represent a ratio. All the parts of the diagram that are the same size have the same value.

For example, this tape diagram represents the ratio of ducks to swans in a pond, which is 4 : 5.



The first tape represents the number of ducks. It has 4 parts.

The second tape represents the number of swans. It has 5 parts.

There are 9 parts in all, because 4 + 5 = 9

Suppose we know there are 18 of these birds in the pond, and we want to know how many are ducks.



The 9 equal parts on the diagram need to represent 18 birds in all. This means that each part of the tape diagram represents 2 birds, because $18 \div 9 = 2$.

There are 4 parts of the tape representing ducks, and $4 \cdot 2 = 8$, so there are 8 ducks in the pond.



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Glossary Terms		
tape diagram		

Unit 2, Lesson 15 **Practice Problems**

- 1. Here is a tape diagram representing the ratio of red paint to yellow paint in a mixture of orange paint.
 - a. What is the ratio of yellow paint to red paint?

cups of red paint 3

cups of yellow paint

3

3

3

3

- b. How many total cups of orange paint will this mixture yield?
- 2. At the kennel, the ratio of cats to dogs is 4 : 5. There are 27 animals in all. Here is a tape diagram representing this ratio.



- a. What is the value of each small rectangle?
- b. How many dogs are at the kennel?
- c. How many cats are at the kennel?
- 3. Last month, there were 4 sunny days for every rainy day. If there were 30 days in the month, how many days were rainy? Explain your reasoning. If you get stuck, consider using a tape diagram.

4. Noah entered a 100-mile bike race. He knows he can ride 32 miles in 160 minutes. At this rate, how long will it take him to finish the race? Use each table to find the answer. Next, explain which table you think works better in finding the answer.

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Table A:

Table B:

elapsed time (minutes)
160

distance (miles)	elapsed time (minutes)
32	160
96	
4	
100	

5. A cashier worked an 8-hour day, and earned \$58.00. The double number line shows the amount she earned for working different numbers of hours. For each question, explain your reasoning.

wages earped (dellars)	0	14.5	29	43.5	58
time worked (bours)		1		1	
time worked (nours)	Ó	2	4	6	8

- a. How much does the cashier earn per hour?
- b. How much does the cashier earn if she works 3 hours?
- 6. A grocery store sells bags of oranges in two different sizes.
 - The 3-pound bags of oranges cost \$4.
 - The 8-pound bags of oranges for \$9.

Which oranges cost less per pound? Explain or show your reasoning.