

NAME

DATE

PERIOD

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?

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*:

1. 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.

NAME _____

DATE _____

PERIOD _____

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.

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

NAME

DATE

PERIOD

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- 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.
 - 4 gallons to \$3.00
 - 1 gallon to \$1.50
 - 30 gallons to \$45.00
 - \$2.00 to 30 gallons
 - \$1.00 to $\frac{2}{3}$ gallon
- 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?
 - Write a ratio for the given information about the cost of pasta.
 - 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.
 - Find the answer and explain or show your reasoning.
- Lin is reading a 47-page book. She read the first 20 pages in 35 minutes.
 - If she continues to read at the same rate, will she be able to complete this book in under 1 hour?
 - If so, how much time will she have left? If not, how much more time is needed? Explain or show your reasoning.

NAME

DATE

PERIOD

4. Diego can type 140 words in 4 minutes.

a. At this rate, how long will it take him to type 385 words?

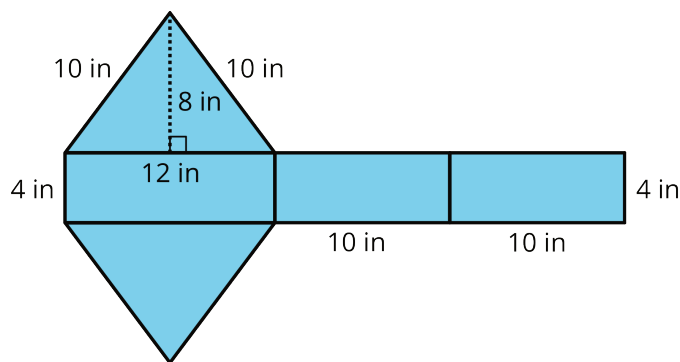
b. How many words can he type in 15 minutes?

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.

(from Unit 2, Lesson 10)

6. Find the surface area of the polyhedron that can be assembled from this net. Show your reasoning.



(from Unit 1, Lesson 14)