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Unit 4, Lesson 11

# Using an Algorithm to Divide Fractions

Let’s divide fractions using the rule we learned.

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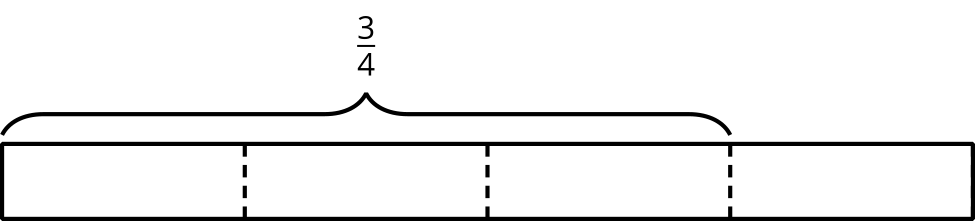
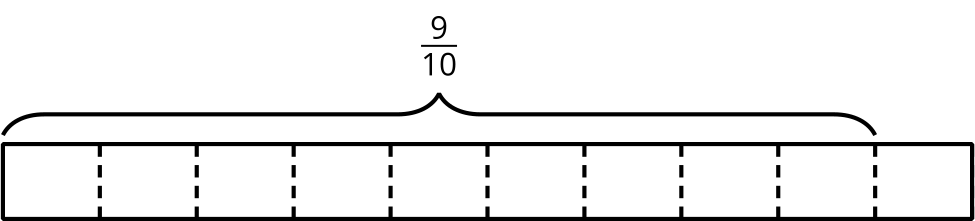
## 11.1Math Talk: Multiplying Fractions

Find the value of each product mentally.

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## 11.2Dividing a Fraction by a Fraction

Work with a partner. One person works on the questions labeled “Partner A” and the other person works on those labeled “Partner B.”

1. Partner A: Find the value of each expression by completing the diagram.
   * How many s are in ?
   * 
   * How many s are in ?
   * 

* Partner B:
* Elena said, “If I want to divide 4 by , I can multiply 4 by 5 and then divide it by 2 or multiply it by .”
* Find the value of each expression using the strategy Elena described.

1. Discuss with your partner:
   1. Where in the diagram for can we see the multiplication by the denominator 8?
   2. Where in the diagram for can we see the division by the numerator 3?
   3. Where in each diagram do you see the quotient?
2. Complete this sentence based on what you noticed:

* To divide a number by a fraction , we can multiply by and then divide the product by .

1. Select **all** the equations that represent the sentence you completed.

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## 11.3Dividing with or without an Algorithm

Calculate at least four quotients. Show your reasoning.

### Are you ready for more?

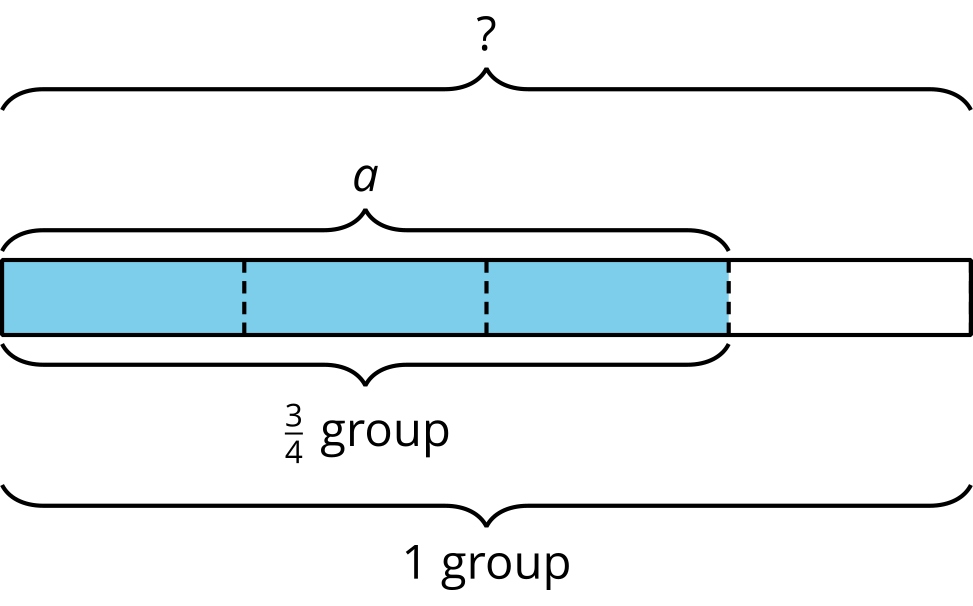
Suppose you have a quart of grape juice and a quart of milk. You pour 1 cup of the grape juice into the milk and mix it up. Then you pour 1 cup of this mixture back into the grape juice.

Which liquid is more contaminated? Explain how you know. (Note: 1 quart is equal to 4 cups.)

## Lesson 11 Summary

We can think of the division in terms of finding the size of 1 group: “If there is in of a group, how much is in 1 group?” or “If of a number is , what is that number?”

On a tape diagram, we can show of a group having a value of and the whole group having an unknown value.



If of a number is , then to find the number, we can first divide by 3 to find of the number. Then we multiply the result by 4 to find the number.

These steps can be written as: . Dividing by 3 is the same as multiplying by , so we can also write the steps as: , which is .

In other words:

In general, dividing a number by a fraction is the same as multiplying the number by , which is the **reciprocal** of the fraction. Reciprocals are numbers that when multiplied equal 1.