

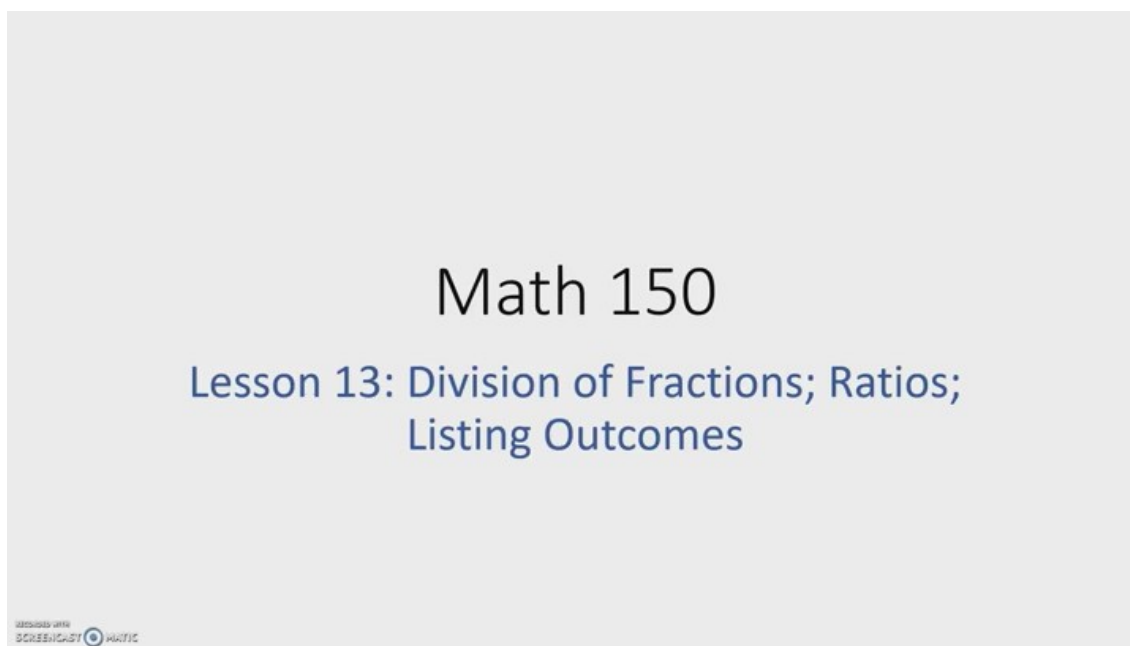
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DIVISION OF FRACTIONS; RATIOS; LISTING OUTCOMES

In division of fractions, sometimes the answer is larger than part of the division problem. We will see how that can happen. To divide fractions, we find the reciprocal of the second fraction then multiply. More simply stated, to divide fractions we multiply by the inverse.

A ratio is a comparison of two quantities. Ratios can be written several ways. A ratio of 7 to 6 may be written 7:6 or could be written $\frac{7}{6}$. The word ratio is pronounced “rash – e – o” with a “long a” in “rash”. We will look at a colorful picture to help us write ratios.

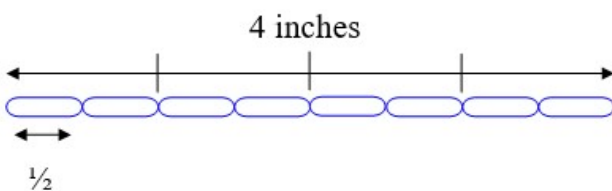
Did you ever have a hard time choosing which outfit you were going to wear? You may have had three shirts, two pairs of pants, and three pairs of shoes from which to choose. In this particular case you would have 18 different outfits that you could put together. No wonder it is such a difficult choice!



Introduction to Division of Fractions

A child's bracelet is 4 inches long. Each of the links is $\frac{1}{2}$ inch long. How many links are in the chain?

Draw a picture to solve.



The diagram shows a horizontal line representing a bracelet, divided into 8 equal segments by vertical tick marks. Above the line, a double-headed arrow spans the entire length, labeled "4 inches". Below the line, a double-headed arrow spans the length of one segment, labeled " $\frac{1}{2}$ ".

$$4 \div \frac{1}{2} = 8$$

Dividend Divisor Quotient

Notice that in division of fractions, the quotient (answer) may be a larger number than either the dividend or the divisor.

It takes eight $\frac{1}{2}$ -inch links to make up a bracelet 4 inches long.

Dividing Fractions

Divide: $\frac{3}{4} \div \frac{4}{5}$

Multiply by the reciprocal (inverse of the second number).



$$\frac{3}{4} \div \frac{4}{5} = \frac{3}{4} \times \frac{5}{4} = \frac{3 \times 5}{4 \times 4} = \frac{15}{16}$$

Divide: $\frac{2}{3} \div \frac{8}{9}$

$$\frac{\cancel{2}^1}{\cancel{3}_1} \times \frac{\cancel{9}^3}{\cancel{8}_4}$$

$$\frac{1 \times 3}{1 \times 4} = \frac{3}{4}$$

Divide: $12 \div \frac{3}{5}$

$$\frac{\cancel{12}^4}{\cancel{1}_1} \times \frac{\cancel{5}^1}{\cancel{3}_1}$$

$$\frac{4 \times 5}{1 \times 1} = \frac{20}{1} = 20$$

12 is a whole number and can be written in fraction form as $\frac{12}{1}$.

Reciprocal of second fraction

Ratios



These leaves can be compared many ways.

The ratio of yellow leaves to green leaves is **4 to 3** which can also be written as **4 : 3** or $\frac{4}{3}$.

The ratio of red leaves to brown leaves is **2 to 3** or **2 : 3** or $\frac{2}{3}$.

The ratio of green to all the leaves is **3 to 12** or **3 : 12** or $\frac{3}{12}$.

The ratio of all to red is **12 to 2** or **12:2** or $\frac{12}{2}$.

Ratios such as 4:3, $\frac{4}{3}$ remain in fraction form (do not simplify to mixed number).

Ratios such as 3:12, $\frac{3}{12}$ may be reduced to its simplest form $\frac{1}{4}$, 1:4.

Ratios such as 12:2, $\frac{12}{2}$, may be reduced to $\frac{6}{1}$, 6:1 (do not simplify to a whole number).

Listing Possible Outcomes



Brooke is deciding on which outfit she will wear to school. She has several choices. She has three shirts – Red, Blue, Gold, and two pairs of slacks – Jeans, Khakis. List all the possible outfit combinations.

Possible Outcomes

Red Shirt & Jeans
Red Shirt & Khakis

Blue Shirt & Jeans
Blue Shirt & Khakis

Gold Shirt & Jeans
Gold Shirt & Khakis

Brooke has 6 possible outfits from which to choose.



Below are additional educational resources and activities for this unit.

[Unit 13 Dividing Fractions and Whole Numbers Worksheet](#)

[Unit 13 Dividing Fractions Worksheet](#)

[Unit 13 Find the Ratios Worksheet](#)

[Unit 13 Equivalent Ratios Worksheet](#)