Dividing Fractions!

It is important to understand what is happening when you multiply fractions. These models help to show what is happening.

These slides were prepared to help students see what is happening when fractions are divided.

Hopefully, by looking at the models, you will understand what it means to divide fractions or to have something be divided by a fraction.

Seeing Division

I have four cookies to share with two people. How many cookies does each person get?

$4 \div 2$

$= 2$ cookies each

Seeing Division

I have four cookies to share with four people. How many cookies does each person get?

$4 \div 4$

$= 1$ cookie each

Seeing Division

I have four cookies to share with eight people. How many cookies does each person get?

$4 \div 8$ or $\frac{4}{8}$

$= 1/2$ cookie each

Seeing Division

I have one cookie to share with two people. How many cookie parts does each person get?

$1 \div 2$ or $\frac{1}{2}$

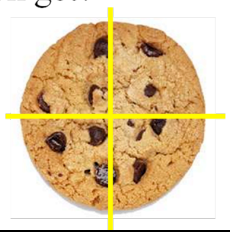
$= 1/2$ cookie parts

Seeing Division

I have one cookie to share with four people. How many cookie parts does each person get?

$1 \div 4$ or $\frac{1}{4}$

$= 1/4$ cookie parts

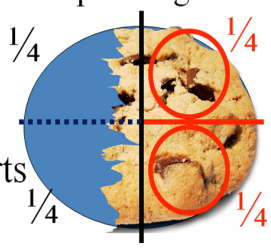


Seeing Division

I have half of a cookie to share with two people. How many cookie parts does each person get?

$\frac{1}{2} \div 2$

= 1/4 cookie parts

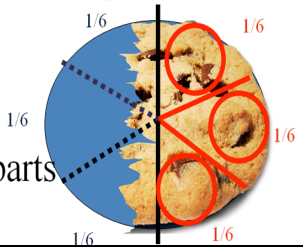


Seeing Division

I have half of a cookie to share with three people. How many cookie parts does each person get?

$\frac{1}{2} \div 3$

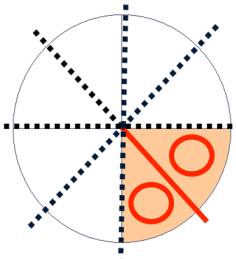
= 1/6 cookie parts



Seeing Division

I have one-fourth of a cookie to share with two people. How many cookie parts does each person get?

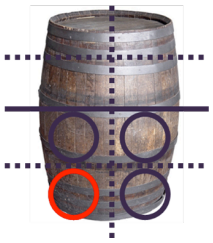
$\frac{1}{4} \div 2 = \frac{1}{8}$ cookie parts



Seeing Division

A factory used 1/2 barrels of almonds to make 4 batches of granola bars. How many barrels of almonds did the factory put in each batch?

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



Seeing Division

A factory used 5/8 barrels of almonds to make 5 batches of granola bars. How many barrels of almonds did the factory put in each batch?

$\frac{5}{8} \div 5 = \frac{1}{8}$ barrels

Seeing Division

A cookie factory uses 1/6 barrels of oatmeal in each batch of cookies. The factory used 5/6 barrels of oatmeal yesterday. How many batches of cookies did the factory make?

$\frac{1}{6} \div \frac{5}{6} = 5$ batches

Seeing Division

A factory uses 1/4 barrels of raisins in each batch of granola bars. Yesterday, the factory used 1/2 barrels of raisins. How many batches of granola bars did the factory make yesterday?

Sometimes the first number in a story isn't the first number in the equation.

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

Seeing Division

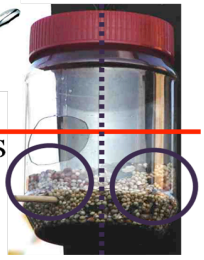
Kurt made 1/2 quarts of hot chocolate. Each mug holds 1/10 quarts. How many mugs will Kurt be able to fill?

$\frac{1}{2} \div \frac{1}{10} = 5$ mugs

Seeing Division

Curtis's bird feeder holds 1/2 cups of birdseed. Curtis is filling the bird feeder with a scoop that holds 1/4 cups. How many scoops of birdseed will Curtis put into the feeder?

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



Seeing Division

Bryan's bird feeder holds 2/3 cups of birdseed. Bryan is filling the bird feeder with a scoop that holds 1/3 cups. How many scoops of birdseed will Bryan put into the feeder?

$\frac{2}{3} \div \frac{1}{3} = 2$ scoops

Dividing (using just the numbers)

These slides were made to explain what to do "number-wise" when dividing fractions.

Some of the slides will have something like this picture: This is showing that the number needs to be renamed as 12/1. Any number over 1 means the same as itself.

$\frac{12}{1} \div$ 12

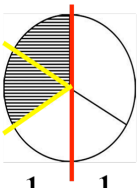
rename

Reciprocal

- When you flip the second fraction, you are writing that fraction's **reciprocal**.

$\frac{3}{5} \rightarrow \frac{5}{3}$

Example 1



$\frac{1}{3} \div \frac{1}{2}$ Rewrite: $\frac{1}{3} \times \frac{2}{1} = \frac{2}{3}$

reciprocal

You have one-third of a pie. How many halves are in that third?

Answer: 2/3 of a half pie

Example 2

$\frac{4}{5} \div \frac{4}{9}$ Rewrite: $\frac{4}{5} \times \frac{9}{4}$

reciprocal

$= \frac{36}{20} \div \frac{4}{4} = \frac{9}{5} = 1\frac{4}{5}$

product simplify mixed number

Example 3

$\frac{12}{1} \div \frac{3}{5}$ Rewrite: $\frac{12}{1} \times \frac{5}{3}$

rename reciprocal

$= \frac{60}{3} = 60 \div 3 = \frac{20}{1} = 20$

product fraction as division simplify

Example 4

$\frac{1}{6} \div \frac{2}{1}$ Rewrite: $\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$

rename reciprocal

To Divide

- Invert (flip over) the second number
- Multiply

$$\frac{2}{5} \div \frac{3}{4} = \frac{2}{5} \times \frac{4}{3} = \frac{8}{15}$$

❶ $\frac{3}{4} \div 2\frac{1}{5}$

❷ $\frac{3}{4} \div \frac{11}{5}$

❸ $\frac{3}{4} \times \frac{5}{11}$

❹ $\frac{3}{4} \times \frac{5}{11} = \frac{15}{44}$

This slide is an example of working through all of the steps in a division problem when there is a mixed number. The mixed number has to be changed to an improper fraction.

Division

- When working word problems, be careful what order you write the problem.
- The thing being split, cut, sorted, shared, divided, or grouped goes first.
- How many pieces or how big goes second.

The following slides have word problems with the problem solved, step by step. The best way to use these slides is to read the problem, try to work it out on your own, then compare your solution with the slide's solution.

See where they are the same and where you might have made a mistake. Hopefully by the time you get to the last slide you won't be making any mistakes!

Fran puts 5 $^1/_3$ lbs of chocolate in $^2/_3$ lb containers. How many containers?

- Chocolate is first as it is split.
- Total divided by How Big is How Many.

$$5\frac{1}{3} \div \frac{2}{3} = \frac{16}{3} \times \frac{3}{2} = \frac{8}{1} \times \frac{1}{1} = 8$$

- 8 containers.

Miss Glover bought a block of cheddar cheese. The block weighed 1/4 pounds. She cut the block up into 2 equal slices. What was the weight of each slice of cheese?

1/4 ÷ 2 =

1/4 ÷ 2/1 =

1/4 x 1/2 = 1/8 pounds

Wilson picked 3/5 pounds of berries. He divided them evenly among 6 containers. How many pounds of berries did Wilson put in each container?

3/5 ÷ 6 =

3/5 ÷ 6/1 =

3/5 x 1/6 = 3/30

3/30 ÷ 3/3 = 1/10 pounds

Alejandro needs to add 1/2 cups of sugar to his cookie dough. He only has a 1/4-cup measure. How many scoops of sugar does Alejandro need to add?

1/2 ÷ 1/4 =

1/2 x 4/1 = 4/2

4 ÷ 2 = 2 scoops

Mr. Monroe bought a block of fudge that weighed 5/8 pounds. He cut the fudge into 5 equal pieces. What was the weight of each piece of fudge?

5/8 ÷ 5 =

5/8 ÷ 5/1 =

5/8 x 1/5 = 5/40

5/40 ÷ 5/5 = 1/8 pounds

Omar bought a piece of rope that was 1 2/3 inches long. He cut the rope into 10 equal pieces. How long is each piece of rope?

1 2/3 ÷ 10 =

5/3 ÷ 10 =

5/3 ÷ 10/1 =

5/3 x 1/10 = 5/30

5/30 ÷ 5/5 = 1/6 inches

Everett's bird feeder holds 2 1/2 cups of birdseed. Everett is filling the bird feeder with a scoop that holds 5/6 cups. How many scoops of birdseed will Everett put into the feeder?

2 1/2 ÷ 5/6 =

5/2 ÷ 5/6 =

5/2 x 6/5 = 30/10

30/10 ÷ 3/3 = 3/1 = 3 scoops

Quick Review

When dividing, flip the second fraction over.
Then multiply the tops and multiply the bottoms.
Easy-peasy!