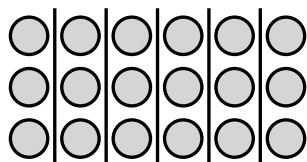


FAMILY MATH

Multiplication of a Whole Number by a Fraction

Dear Family,

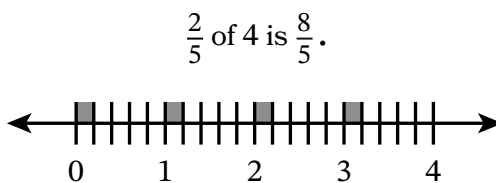
Your student is learning that fractions can represent parts of a set or a number, such as 1 sixth of a group of 18 items. Previously they worked with fractions from parts of a whole such as 1 third of a shape. They discover that knowing the unit fraction of a set can be helpful to find other fractions of the set when the denominator and whole number of the set remain the same. For example, if students know $\frac{1}{5}$ of 10 then finding $\frac{3}{5}$ of 10 is simpler because $\frac{3}{5}$ of 10 is 3 times as much as $\frac{1}{5}$ of 10. Students find fractions of a set and multiply whole numbers by fractions. They use arrays, number lines, and tape diagrams to represent problems. Students realize that when they find a fraction of a whole number, they are multiplying. For example, $\frac{3}{5}$ of 10 has the same value as $\frac{3}{5} \times 10$. They use their understanding of multiplying fractions and whole numbers to convert between customary units such as pounds and ounces.



$\frac{1}{6}$ of 18 is 3.

$\frac{3}{6}$ of 18 is 9.

Students use arrays to represent a whole number, and then partition, or divide, the array into equal groups.



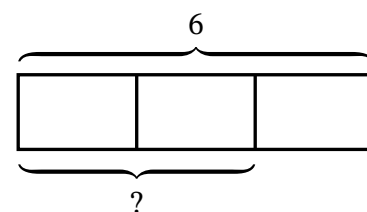
$\frac{2}{5}$ of 4 is $\frac{8}{5}$.

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{4}{5}$$

$\frac{1}{5}$ of 4 is $\frac{4}{5}$.

$$\frac{4}{5} + \frac{4}{5} = \frac{8}{5}$$

Students can use number lines or tape diagrams to represent the problem. They use what they know about finding a unit fraction of a whole number to find other fractions of a whole number. A unit fraction is exactly 1 of a specific fractional unit. For example, $\frac{1}{4}$ is a unit fraction for the fractional unit fourths.



$$3 \text{ units} = 6$$

$$1 \text{ unit} = \frac{6}{3}$$

$$2 \text{ units} = 2 \times \frac{6}{3} = 4$$

Students can use multiplication to find a fraction of a whole number.

At-Home Activity

Multiply Fractions

Create a fraction by rolling a number cube twice and using the first number rolled for the numerator and the second number rolled for the denominator. Then roll the number cube again to get a whole number. Ask your student to multiply the fraction by the whole number. If you do not have a number cube, use six index cards or pieces of paper numbered 1–6. Place the cards face down. Invite your student to select two cards to make the fraction. Then return the cards to the pile and select another card to get a whole number.

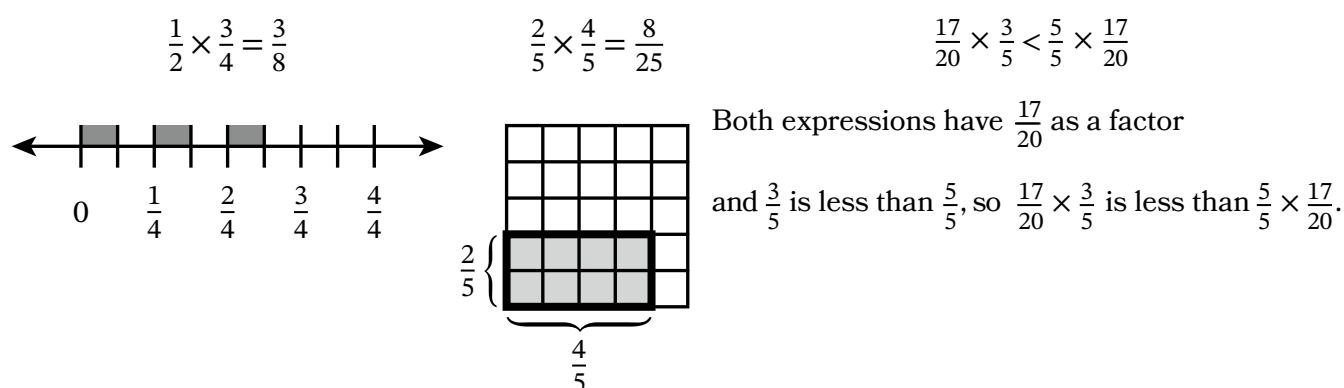
- When your student rolls a 1 and a 3, the fraction is $\frac{1}{3}$. If they then roll a 5 as the whole number, your student will find $\frac{1}{3} \times 5$. $\left(\frac{1}{3} \times 5 = \frac{5}{3}\right)$
- When your student rolls a 5 and a 4, the fraction is $\frac{5}{4}$. If they then roll a 2 as the whole number, your student will find $\frac{5}{4} \times 2$. $\left(\frac{5}{4} \times 2 = \frac{10}{4}\right)$

FAMILY MATH

Multiplication of Fractions

Dear Family,

Your student is learning various methods to multiply two fractions. They partition, or divide, number lines and area models to multiply fractions less than 1 and greater than 1. Students learn they can make a simpler problem by reasoning about the factors before they multiply. They use unit language and known products to make simpler problems and practice comparing expressions with two fractions without evaluating. Students recognize that the size of the factors affects the size of the product.



Students partition a number line to find the product of a unit fraction and a fraction less than 1. The first factor is a unit fraction because it has a numerator of 1.

Students partition an area model to find the product of two fractions less than 1.

When a number is multiplied by a fraction less than 1, the product is less than the number. When a number is multiplied by a fraction greater than 1, the product is greater than the number.

At-Home Activities

Calendar Multiplication

Ask your student to pick two holidays and note on which day of the week the holidays fall. For each holiday, have your student use the number for the day of the week (using 1 for Sunday) as the numerator of a fraction and the number for the month as its denominator. Then multiply the fractions. For example, Memorial Day is on a Monday in May, so the fraction is $\frac{2}{5}$. Thanksgiving is on a Thursday in November, so the fraction is $\frac{5}{11}$. Your student would then find $\frac{2}{5} \times \frac{5}{11} = \left(\frac{10}{55} \text{ or } \frac{2}{11}\right)$

Recipes with Fractions

Find a recipe that has a fraction in the ingredients list. Ask your student to determine how much of that ingredient is needed to make $\frac{1}{2}$ the recipe. (Multiply by $\frac{1}{2}$.) Then ask how much is needed for $2\frac{1}{2}$ times the recipe. (Multiply by $\frac{5}{2}$.)

FAMILY MATH

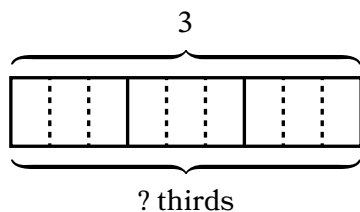
Division with a Unit Fraction and a Whole Number

Dear Family,

Your student is learning to divide a whole number by a unit fraction and to divide a unit fraction by a whole number. A unit fraction, such as $\frac{1}{3}$, $\frac{1}{8}$, or $\frac{1}{15}$, is exactly 1 of a specific fractional unit. They begin by exploring division when the divisor represents the size of each group, and then when the divisor represents the number of groups. Students use tape diagrams and number lines to reason about division. Your student makes connections about the size of quotients, or answers. They see that the quotient of a whole number and a unit fraction is greater than the dividend, and that the quotient of a unit fraction and a whole number is less than the dividend. Students solve real-world problems involving fractions with multiplication and division.

Number of Groups

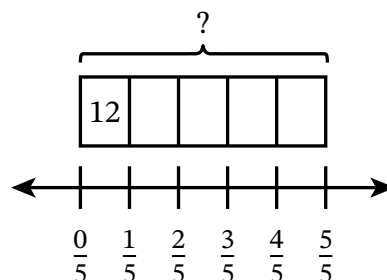
$$3 \div \frac{1}{3}$$



There are 9 groups.

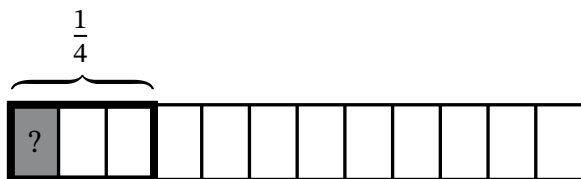
Size of the Group

$$12 \div \frac{1}{5}$$



The size of the whole group is 60.

$$\frac{1}{4} \div 3$$



The shaded part represents $\frac{1}{12}$.

$$\frac{1}{2} \div 4 > \frac{1}{4} \div 4$$

Both expressions have a divisor of 4.

Because $\frac{1}{2} > \frac{1}{4}$, that means $\frac{1}{2} \div 4$ has the greater quotient.

At-Home Activity

At Home Division

Practice dividing a whole number by a unit fraction and a unit fraction by a whole number by asking your student questions about home activities. Then ask them to write or say the equation. For example:

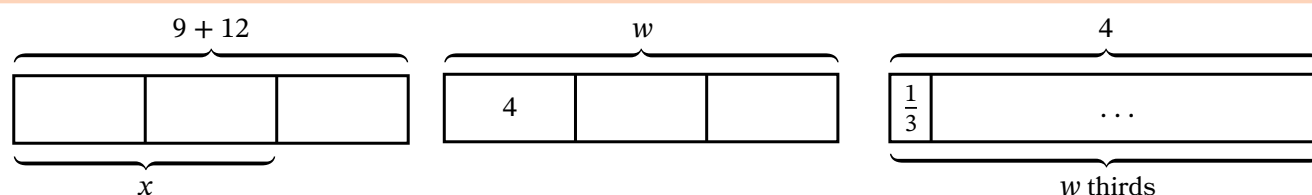
- “2 hours is $\frac{1}{5}$ the total number of hours that you spend practicing piano each month. How many hours do you spend practicing each month?” $\left(2 \div \frac{1}{5} = 10\right)$
- “If you pour $\frac{1}{4}$ gallon of milk equally into 2 glasses, how much milk is in each glass?” $\left(\frac{1}{4} \div 2 = \frac{1}{8}\right)$

FAMILY MATH

Multi-Step Problems with Fractions

Dear Family,

Your student is learning to use their knowledge of operations and fractions to model and solve multi-step problems that require the use of addition, subtraction, multiplication, and division. Students evaluate expressions with parentheses and use tape diagrams to make sense of the expressions. They recognize that the same equation can be represented in different ways.



The tape diagram shows x is equal to $\frac{2}{3}$ of the sum of 9 and 12, or $x = \frac{2}{3} \times (9 + 12)$.

Both diagrams show $4 \div \frac{1}{3} = w$. On the left, $\frac{1}{3}$ represents the number of groups, and on the right, $\frac{1}{3}$ represents the size of each group.

At-Home Activities

Create Word Problems

Have your student find two sets of objects around your home that can easily be combined, such as cereal pieces and pretzels, or different coins. Have your student combine the items, and then create a word problem for the situation. For example, “I have 16 coins. $\frac{1}{4}$ of my coins are nickels. The rest are pennies. How many pennies do I have?” ($16 \times \frac{3}{4} = 12$ pennies)

Fractions of Rhymes and Tales

Share some of the situations below with your student. Encourage them to explain how they solved.

- “If Jack climbs halfway up the beanstalk in the first hour, and then climbs halfway up the remaining distance in the next hour, how far up the beanstalk does he climb?”
($\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$)
- “If the Muffin Man bakes muffins for 3 hours one day and then for only one third of that time the next day, how many hours does he bake muffins altogether?”
($3 + (\frac{1}{3} \times 3) = 4$)
- “If Little Miss Muffet eats $2\frac{1}{2}$ cups of curds and whey one afternoon, and then eats one half that much the next afternoon, how much does she eat in two afternoons?”
($2\frac{2}{4} + 1\frac{1}{4} = 3\frac{3}{4}$)