

Math Tips for Parents

Grade 5 • Unit 5

Multiplication and Division of Fractions and Decimal Fractions

In this unit, students learn to multiply fractions and decimal fractions and start work with fraction division. Students will begin by measuring fractional parts on a number line and other concrete ways of understanding fractional parts of a whole, and eventually move to more abstract fraction operations.

Grade Level Standards

5.MD.1, 5.MD.2, 5.NF.3, 5.NF.4, 5.NF.5, 5.NF.6, 5.NF.7, 5.NBT.7, 5.OA.1, 5.OA.2

Target Goals

- Converts and solves multi-step word problems using measurement.
- Multiplies and divides fractions.
- Performs operations with multi-digit whole number and decimals to the hundredths.
- Writes and interprets numerical expressions.

Key Vocabulary



- Decimal divisor- the number that divides the whole and that has units of tenths, hundredths, thousandths, e.g. $1/100$
- Simplify - using the largest fractional unit possible to express an equivalent fraction, e.g. $4/6$ simplifies to $2/3$, with the denominator 3 being a larger fractional unit than 6
- Factors - numbers that are multiplied to obtain a product
- Unit - one segment of a partitioned tape diagram
- Unknown - the missing factor or quantity in multiplication or division
- Whole Unit - any unit that is partitioned into smaller, equally sized fractional units

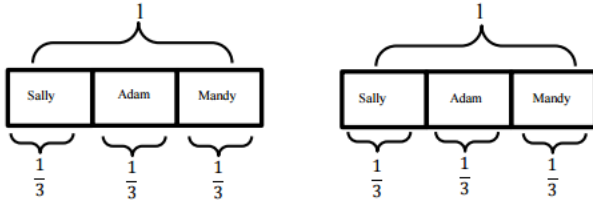
How you can help at home:



- Continue to practice and review multiplication and division math facts – this greatly supports work with fractions!
- Look for opportunities in daily life to discuss both fractional parts of a whole and of other fractions, e.g. What is $\frac{1}{4}$ of 20? $\frac{1}{4}$ of $\frac{1}{2}$?
- Find examples of fractions around the house or neighborhood. Add, subtract, multiply, divide or simplify the fractions that you find.
- Create numbers to use in fractions. Draw these fractions as parts of a whole or set.
- Use measuring cups when baking or cooking.
- Draw different shapes. Divide them into different fractions.

Models and Representations

Using a picture, show how friends Sally, Adam, and Mandy could share two candy bars.



Strategy:

Draw two tape diagrams since there are 2 candy bars. Divide each candy bar into 3 equal parts and then share among the three friends.

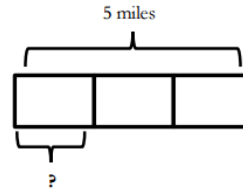
Unit Form: $6 \text{ thirds} \div 3 = 2 \text{ thirds}$

Division Equation: $2 \div 3 = \frac{2}{3}$

Each friend gets $\frac{2}{3}$ of the candy bars.

Check: $3 \times \frac{2}{3} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{6}{3} = 2$ candy bars

Mark ran a total of 5 miles in 3 days. If Mark runs the same distance every day, how many miles does he run each day?



Strategy:

To solve this problem use a tape diagram.

We know that 3 units are equal to 5 miles. We want to know what 1 unit is equal to.

3 units = 5

$$1 \text{ unit} = 5 \div 3 = \frac{5}{3} = 1 \frac{2}{3}$$

Algorithm

$$\begin{array}{r} \frac{2}{3} \\ 3 \overline{) 5} \\ \underline{-3} \\ 2 \end{array}$$

Mark ran $1 \frac{2}{3}$ miles each day.

Check

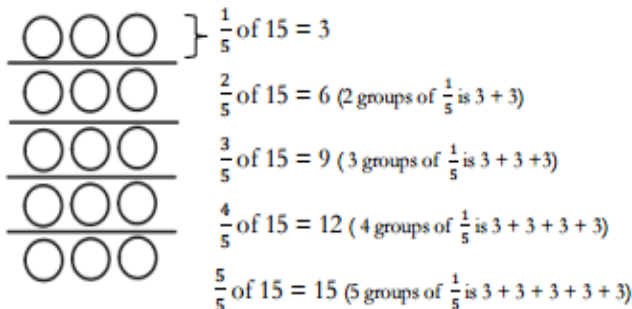
$$\begin{aligned} 3 \times 1 \frac{2}{3} &= 1 \frac{2}{3} + 1 \frac{2}{3} + 1 \frac{2}{3} \\ &= 3 + \frac{6}{3} = 3 + 2 = 5 \end{aligned}$$

Find $\frac{4}{5}$ of 15. Draw a set/array to show your thinking.



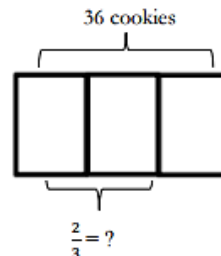
Strategy:

Make an array of 15 circles
Use lines to divide the array into 5 equal groups



Mrs. Collins baked 3 dozen cookies. Two-thirds of them were chocolate chip. How many chocolate chip cookies did she bake?

1 dozen is 12 cookies, so 3 dozen is 36 cookies (12×3)
 $\frac{2}{3}$ of 36 cookies = _____ chocolate chip cookies



3 units = 36

1 unit = $\frac{36}{3}$ or $36 \div 3$
= 12 cookies

2 units = 2×12 cookies
= 24 cookies

Numerical Procedure:

$$\frac{2}{3} \text{ of } 36 = \frac{2}{3} \times 36 = \frac{2 \times 36}{3} = \frac{72}{3} = 24$$

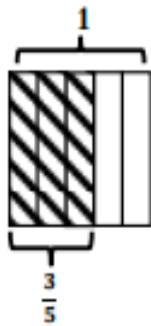
Of the students on Nia's track team, $\frac{3}{5}$ participate in running events. Of the students who participate in running events, $\frac{2}{3}$ are in the relay race. What fraction of the students on the track team ran in the relay race?



We need to find $\frac{2}{3}$ of $\frac{3}{5}$.

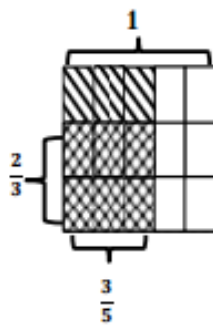
Step 1:

Draw a rectangle and cut it vertically into 5 equal parts. Shade 3 parts and label it $\frac{3}{5}$.



Step 2:

Split the rectangle into 3 equal parts by drawing horizontal lines. Now shade 2 of the 3 parts (that are already shaded) and label it $\frac{2}{3}$.



Step 3:

How many units make our whole? What is the name of these units? How many parts are shaded?

Six of the fifteen parts are shaded.

$$\frac{2}{3} \text{ of } \frac{3}{5} = \frac{6}{15}$$

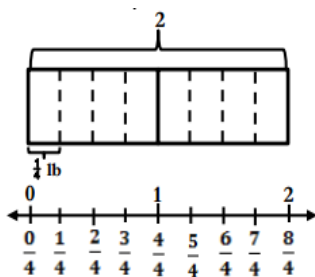
$$\frac{2}{3} \times \frac{3}{5} = \frac{6}{15}$$

Students will eventually see a pattern and multiply numerator times numerator and denominator times denominator.

$$\frac{2}{3} \times \frac{3}{5} = \frac{2 \times 3}{3 \times 5} = \frac{6}{15}$$

Francois picked 2 pounds of blackberries. If he wants to separate the blackberries into $\frac{1}{4}$ pound bags, how many bags can he make?

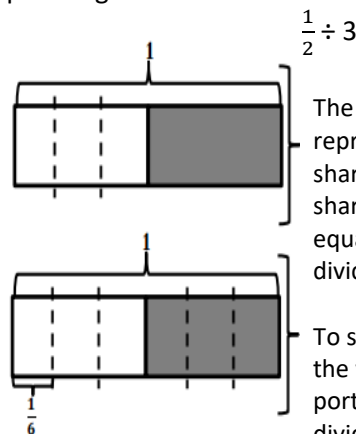
$$2 \div \frac{1}{4} = 8$$



One whole has 4 fourths and 2 wholes has 8 fourths.

Francois can make 8 bags with $\frac{1}{4}$ pound of blackberries in each.

Randy and two of his friends equally share $\frac{1}{2}$ of a pizza. What fractional portion of the pizza does each person get?



The unshaded portion represents the pizza to be shared. Since 3 people are sharing half of the pizza equally, the unshaded part is divided into 3 equal units.

To show equal sized units in the whole pizza, the shaded portion also needs to be divided into 3 equal units. Now we can see that each part is $\frac{1}{6}$ of the whole pizza.

$$\frac{1}{2} \div 3 = \frac{1}{6}$$

Each person gets $\frac{1}{6}$ of a pizza.