

## Multiplication and Division Fact Families

For each \_\_\_\_\_ sentence, there are related \_\_\_\_\_ sentences that show the same information. These number sentences form a related set of facts called a \_\_\_\_\_.

	Example 1	Example 2
Multiplication Sentence	$4 \times 5 = 20$	$17 \times N = 51$
Related Number Sentences	$5 \times \underline{\quad} = 20$ $20 \div \underline{\quad} = 4$ $20 \div 4 = \underline{\quad}$	$N \times 17 = 20$ $51 \div \underline{\quad} = 17$ $51 \div \underline{\quad} = N$

### Generalization

Any multiplication sentence, whether involving fractions or whole numbers, can be written in the form

$$(\text{factor 1}) \times (\text{factor 2}) = \text{product}$$

How can you rearrange the sentence above but still keep the same relationship between factor 1, factor 2, and the product?

Write a complete fact family for each of the following equations.

Equation	Fact Family
$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	
$\frac{3}{4} \times \frac{5}{8} = \frac{15}{32}$	

Write a complete fact family for each of the following equations.

Equation	Fact Family
$\frac{9}{40} \div \frac{3}{5} = \frac{3}{8}$	
$\frac{4}{15} \div \frac{2}{5} = \frac{2}{3}$	

How can fact families be used to find an unknown value in a multiplication or division sentence?

Equation	Fact Family	Value of N
$1 \div N = \frac{2}{3}$	$1 \div \frac{2}{3} = N$ $\frac{2}{3} \times N = 1$ $N \times \frac{2}{3} = 1$	<p>Method 1: Using the second equation,</p> $\frac{2}{3} \times N = 1$ $\frac{2}{3} \times \frac{3}{2} = \frac{6}{6} = 1, \text{ so } N = \frac{3}{2}.$ <p>Method 2: Using the first equation,</p> $1 \div \frac{2}{3} = \frac{3}{3} \div \frac{2}{3} = \frac{3 \div 2}{3 \div 3} = \frac{3}{2}$ <p>, so <math>N = \frac{3}{2}</math>.</p>
$\frac{8}{15} \div N = \frac{2}{3}$		

Write a complete fact family for each of the equations and use the fact family to find the value of N.

Equation	Fact Family	Value of N
$\frac{3}{8} \times N = \frac{21}{80}$		
$\frac{2}{3} \times N = \frac{10}{15}$		

**Extra Practice:** Complete **Let's Be Rational p.74 #16-21** on a loose leaf, and attach to the back of this packet.

How we use fact families to make sense of real world situations?

ExampleIf each person eats a quarter ( $\frac{1}{4}$ ) of a pie, 7 people will eat one and three quarter ( $1\frac{3}{4}$ ) pies.

$$\frac{1}{4} \times 7 = 1\frac{3}{4}$$

part of pie  $\times$  people = total pies

If one and three quarter pies are equally shared among 7 people, each person will get one quarter pie.

$$1\frac{3}{4} \div 7 = \frac{1}{4}$$

total pies  $\div$  people = part of pie

If one and three quarter pies are given out as one quarter pie per person, 7 people will be served.

$$1\frac{3}{4} \div \frac{1}{4} = 7$$

total pies  $\div$  part of pie = people

Write the **number sentence** in a fact family that matches each description.

Skylar walks at a steady rate of  $3\frac{1}{3}$  miles per hour and walks for  $1\frac{1}{2}$  hours to reach her home 5 miles away.

To reach her home 5 miles away, Skylar walks at a steady rate of  $3\frac{1}{3}$  miles per hour for  $1\frac{1}{2}$  hours.

To reach her home 5 miles away, Skylar walks for  $1\frac{1}{2}$  hours at a steady rate of  $3\frac{1}{3}$  miles per hour.

Write a **description** that matches each number sentence in the fact family.

$$\frac{5}{8} \times 3 = 1\frac{7}{8}$$

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$$1\frac{7}{8} \div 3 = \frac{5}{8}$$

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$$1\frac{7}{8} \div \frac{5}{8} = 3$$

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**Extension:** Complete **Let's Be Rational p.71 Problem 4.3** on a loose leaf, and attach to the back of this packet.