

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## DIVIDING FRACTIONS

### N-GEN MATH<sup>®</sup> 6



Dividing two fractions can seem like a strange idea. To begin to think about division of fractions, keep in mind that we can justify every division sentence with one involving multiplication.

**Exercise #1:** Justify each of the following division sentences using a multiplication sentence.

(a)  $18 \div 2 = 9$  because \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

(b)  $42 \div 6 = 7$  because \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

(c)  $5 \div \frac{1}{2} = 10$  because \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

(d)  $\frac{1}{5} \div 3 = \frac{1}{15}$  because \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_

Even “trickier” division sentences like (c) and (d) can be thought of in terms of multiplication. Let’s now look at division of fractions whose quotients can be found this way.

**Exercise #2:** For each of the following fraction division problems, find the quotients by filling in the **missing part** of the **multiplication sentence**.

(a)  $\frac{6}{35} \div \frac{3}{5} =$  \_\_\_\_\_  $\frac{3}{5} \times$  \_\_\_\_\_  $= \frac{6}{35}$       (b)  $\frac{45}{16} \div \frac{5}{8} =$  \_\_\_\_\_  $\frac{5}{8} \times$  \_\_\_\_\_  $= \frac{45}{16}$

(c)  $\frac{55}{21} \div \frac{11}{3} =$  \_\_\_\_\_  $\frac{11}{3} \times$  \_\_\_\_\_  $= \frac{55}{21}$       (d)  $\frac{35}{36} \div \frac{7}{3} =$  \_\_\_\_\_  $\frac{7}{3} \times$  \_\_\_\_\_  $= \frac{35}{36}$

**Exercise #3:** The quotient  $\frac{28}{15} \div \frac{2}{5}$  is closest to which whole number? Justify your answer.



A curious thing happens when the two fractions that we are dividing have the same **denominator**.

**Exercise #4:** For each of the following division problems, determine the quotient by filling in the missing portion of the multiplication sentence. In (c) and (d) think about **cross cancelling**.

(a)  $\frac{8}{3} \div \frac{4}{3} = \underline{\hspace{2cm}}$        $\frac{4}{3} \times \underline{\hspace{2cm}} = \frac{8}{3}$       (b)  $\frac{10}{7} \div \frac{2}{7} = \underline{\hspace{2cm}}$        $\frac{2}{7} \times \underline{\hspace{2cm}} = \frac{10}{7}$

(c)  $\frac{7}{4} \div \frac{3}{4} = \underline{\hspace{2cm}}$        $\frac{3}{4} \times \underline{\hspace{2cm}} = \frac{7}{4}$       (d)  $\frac{2}{5} \div \frac{11}{5} = \underline{\hspace{2cm}}$        $\frac{11}{5} \times \underline{\hspace{2cm}} = \frac{2}{5}$

It appears that **when dividing two fractions with the same denominator**, you **simply** must **divide the numerators**. Practice this by quickly doing the next exercise.

**Exercise #5:** Find each of the following quotients. If the answers are whole numbers, leave them that way. If the answers are fractions, write them in simplest form.

(a)  $\frac{12}{5} \div \frac{2}{5}$       (b)  $\frac{18}{7} \div \frac{2}{7}$       (c)  $\frac{3}{5} \div \frac{2}{5}$       (d)  $\frac{4}{9} \div \frac{8}{9}$

The trickiest type of fraction division comes when the fractions do not have a common denominator and aren't simple to justify using multiplication as in Exercise #2.

**Exercise #6:** Consider the division problem  $\frac{5}{6} \div \frac{2}{3}$ .

- (a) Rewrite the division problem so that both fractions have a common denominator and then find the quotient.      (b) Check your answer to (a) by using multiplication.



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**DIVIDING FRACTIONS**  
**N-GEN MATH<sup>®</sup> 6 HOMEWORK**

**FLUENCY**

1. For each of the following fraction division problems, find the quotients by filling in this missing part of the multiplication sentence.

(a)  $\frac{1}{8} \div \frac{1}{2} =$  \_\_\_\_\_  $\frac{1}{2} \times$  \_\_\_\_\_  $= \frac{1}{8}$

(b)  $\frac{15}{56} \div \frac{3}{8} =$  \_\_\_\_\_  $\frac{3}{8} \times$  \_\_\_\_\_  $= \frac{15}{56}$

(c)  $\frac{63}{10} \div \frac{9}{5} =$  \_\_\_\_\_  $\frac{9}{5} \times$  \_\_\_\_\_  $= \frac{63}{10}$

(d)  $\frac{20}{27} \div \frac{5}{3} =$  \_\_\_\_\_  $\frac{5}{3} \times$  \_\_\_\_\_  $= \frac{20}{27}$

2. Perform the following fraction division problems where the fractions have a common denominator. Write your answers as either whole numbers or fractions in simplest form.

(a)  $\frac{10}{3} \div \frac{2}{3}$

(b)  $\frac{8}{5} \div \frac{3}{5}$

(c)  $\frac{4}{7} \div \frac{6}{7}$

(d)  $\frac{8}{5} \div \frac{6}{5}$

(e)  $\frac{24}{11} \div \frac{4}{11}$

(f)  $\frac{8}{3} \div \frac{10}{3}$

3. Find the following quotients by rewriting each fraction with a common denominator and then using the division technique from #2.

(a)  $\frac{9}{2} \div \frac{7}{3}$

(b)  $\frac{5}{4} \div \frac{8}{5}$



## USING YOUR MATH

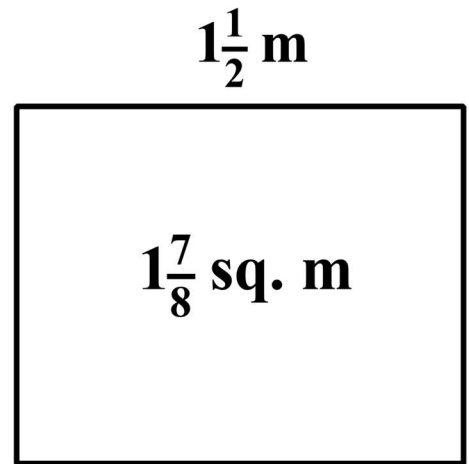
4. A rectangle has an area of  $1\frac{7}{8}$  square meters and has a length of  $1\frac{1}{2}$  meters.

- (a) Express both the area and the length as improper fractions.

area = \_\_\_\_\_ length = \_\_\_\_\_

- (b) Write an expression using division that could be used to find the width of the rectangle.

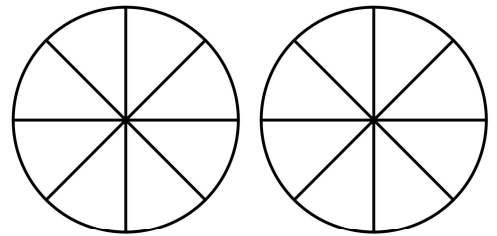
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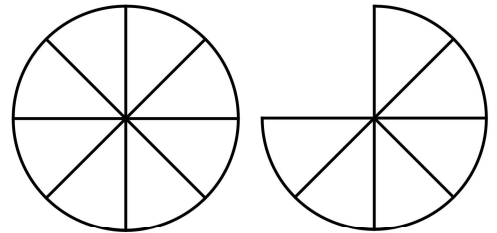
- (c) Determine the width of the rectangle as an improper fraction and mixed number. Use a multiplication sentence to justify your answer.

5. After a party, the Tyler family has  $3\frac{6}{8}$  pizzas left over (shown below). They want to divide the leftover pieces into sections that are each  $\frac{3}{8}$  of a pizza.

- (a) How many total eighths of a pizza does the family have left over?



- (b) Write an expression involving division of fractions that will result in how many sections they will have when they divide up the leftovers.



- (c) How many sections will they have? Shade one such section in the diagram above.

