

**North Penn School District**  
**Elementary Math Parent Letter**

**Grade 6**

**Unit 1 – Chapter 2: Fractions**

**Examples for each lesson:**

**Lesson 2.1**

**Fractions and Decimals**

**Terminating decimals** end. **Repeating decimals** do not end but have repeating digits. One way to convert a terminating decimal to a fraction or mixed number is to read the number.

Look at the decimal 5.75. The right-hand digit is in the hundredths place. Read 5.75 as "five and seventy-five hundredths."

whole number →  $5 \frac{75}{100}$  ← fraction

As a mixed number, the whole number is 5.  
The numerator is 75. The denominator is 100.

Write the fraction in simplest form using the greatest common factor.

75: 1, 3, 5, 15, 25, 75  
100: 1, 2, 4, 5, 10, 20, 25, 50, 100  
GCF = 25

$$5 \frac{75}{100} = 5 \frac{75 \div 25}{100 \div 25} = 5 \frac{3}{4}$$

So,  $5.75 = 5 \frac{3}{4}$  in simplest form.

Identify the decimal and the fraction in simplest form for point E.

**Decimal**  
Between 0 and 1 there are 10 spaces.  
So, each space represents 0.1. Point E is one space to the right of 0.4.  
Point E is the next tenth, or 0.5.  
So, Point E is at  $0.5 = \frac{1}{2}$ .

**Fraction**  
Read 0.5 as "five-tenths." Write  $\frac{5}{10}$ .  
Simplify by dividing the numerator and denominator by the GCF, 5.  
 $\frac{5 \div 5}{10 \div 5} = \frac{1}{2}$

More information on this strategy is available on Animated Math Model #7.

## Lesson 2.2

### Divide by 1-Digit Divisors

You can use compatible numbers to help you place the first digit in the quotient. Then you can divide and check your answer.

**Divide.**  $4\overline{)757}$

**Step 1** Estimate with compatible numbers to decide where to place the first digit.

$$\begin{array}{r} 757 \div 4 \\ \downarrow \\ 800 \div 4 = 200 \end{array}$$

The first digit of the quotient is in the hundreds place.

**Step 2** Divide.

$$\begin{array}{r} 189 \text{ r}1 \\ 4\overline{)757} \\ \underline{-4} \phantom{0} \\ 35 \\ \underline{-32} \\ 37 \\ \underline{-36} \\ 1 \end{array}$$

**Step 3** Check your answer.

$$\begin{array}{r} 189 \leftarrow \text{quotient} \\ \times 4 \leftarrow \text{divisor} \\ \hline 756 \\ + 1 \leftarrow \text{remainder} \\ \hline 757 \leftarrow \text{dividend} \end{array}$$

Since 189 is close to the estimate of 200, the answer is reasonable.

So,  $757 \div 4$  is 189 r1.

More information on this strategy is available on Animated Math Model #8.

## Lesson 2.3

### Multiply Fractions

To multiply fractions, you can multiply numerators and multiply denominators. Write the product in simplest form.

**Find**  $\frac{3}{10} \times \frac{4}{5}$ .

**Step 1** Multiply numerators. Multiply denominators.

$$\frac{3}{10} \times \frac{4}{5} = \frac{3 \times 4}{10 \times 5} = \frac{12}{50}$$

**Step 2** Write the product in simplest form.

$$\frac{12}{50} = \frac{12 \div 2}{50 \div 2} = \frac{6}{25}$$

So,  $\frac{3}{10} \times \frac{4}{5} = \frac{6}{25}$ .

To simplify an expression with fractions, follow the order of operations as you would with whole numbers.

**Find**  $\left(\frac{5}{7} - \frac{3}{14}\right) \times \frac{1}{10}$ .

**Step 1** Perform the operation in parentheses. To subtract, write an equivalent fraction using a common denominator.

Multiply the numerator and denominator of  $\frac{5}{7}$  by 2 to get a common denominator of 14.

$$\begin{aligned} \left(\frac{5}{7} - \frac{3}{14}\right) \times \frac{1}{10} &= \left(\frac{5 \times 2}{7 \times 2} - \frac{3}{14}\right) \times \frac{1}{10} \\ &= \left(\frac{10}{14} - \frac{3}{14}\right) \times \frac{1}{10} \\ &= \frac{7}{14} \times \frac{1}{10} \end{aligned}$$

**Step 2** Multiply numerators. Multiply denominators.

$$= \frac{7 \times 1}{14 \times 10} = \frac{7}{140}$$

**Step 3** Write the product in simplest form. Divide the numerator and the denominator by the GCF.

$$= \frac{7 \div 7}{140 \div 7} = \frac{1}{20}$$

So,  $\left(\frac{5}{7} - \frac{3}{14}\right) \times \frac{1}{10} = \frac{1}{20}$ .

More information on this strategy is available on Animated Math Model #9.

## Lesson 2.4

### Simplify Factors

Sometimes you can simplify before you multiply fractions.

Find the product of  $\frac{5}{6} \times \frac{4}{15}$ . Simplify before multiplying.

**Step 1** Rewrite as a single fraction.

$$\frac{5 \times 4}{6 \times 15}$$

**Step 2** Look for numbers in the numerator that have common factors with numbers in the denominator. Find the GCF.

$$\frac{\cancel{5} \times \cancel{4}}{\cancel{6} \times \cancel{15}}$$

The GCF of 5 and 15 is 5.  
The GCF of 6 and 4 is 2.

**Step 3** Divide.

$$\begin{aligned} 5 \div 5 &= 1 \\ 15 \div 5 &= 3 \end{aligned}$$

$$\begin{aligned} 6 \div 2 &= 3 \\ 4 \div 2 &= 2 \end{aligned}$$

$$\frac{\overset{1}{\cancel{5}} \times \overset{2}{\cancel{4}}}{\underset{3}{\cancel{6}} \times \underset{3}{\cancel{15}}}$$

**Step 4** Rewrite the fraction with the new numbers. Multiply the numerators. Multiply the denominators.

$$\frac{1 \times 2}{3 \times 3} = \frac{2}{9}$$

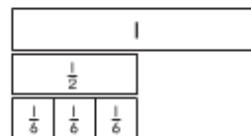
So,  $\frac{5}{6} \times \frac{4}{15} = \frac{2}{9}$ .

## Lesson 2.5

### Model Fraction Division

Use fraction strips to find  $\frac{1}{2} \div 3$ .

**Step 1**  $\frac{1}{2} \div 3$  can mean divide  $\frac{1}{2}$  into 3 equal parts and find how much is in each part. Find a fraction strip such that 3 of that strip make the same length as a single  $\frac{1}{2}$ -strip.



**Step 2** There are three  $\frac{1}{6}$ -strips in  $\frac{1}{2}$ , so  $\frac{1}{2} \div 3 = \frac{1}{6}$ .

## Lesson 2.6

### Estimate Quotients

You can use compatible numbers to help you estimate the quotient of fractions and mixed numbers.

**Example 1:** Estimate  $19\frac{5}{7} \div 3\frac{4}{5}$  using compatible numbers.

**Step 1** Find whole numbers that are close to  $19\frac{5}{7}$  and  $3\frac{4}{5}$  that are easy to divide mentally.

**Think:**  $19\frac{5}{7}$  is close to 20, and  $3\frac{4}{5}$  is close to 4.

**Step 2** Rewrite the problem and then divide:  $20 \div 4 = 5$

So, the estimated quotient is 5.

**Example 2:** Estimate  $6\frac{1}{5} \div \frac{3}{8}$  using compatible numbers.

**Step 1** Rewrite the problem using compatible numbers.  $6 \div \frac{1}{2}$

**Step 2** Divide. Think: How many halves are in 6 wholes? 12

So, the estimated quotient is 12.

More information on this strategy is available on Animated Math Model #10.

## Lesson 2.7

### Divide Fractions

You can multiply by reciprocals to divide fractions.

**Write the reciprocal of  $\frac{1}{7}$ .**

To find the reciprocal of a number, switch the numerator and the denominator.

$$\frac{1}{7} \longleftrightarrow \frac{7}{1}$$

Since  $\frac{1}{7} \times \frac{7}{1} = 1$ , the reciprocal of  $\frac{1}{7}$  is  $\frac{7}{1}$ .

**Find the quotient of  $\frac{4}{5} \div \frac{1}{4}$ . Write it in simplest form.**

**Step 1** Find the reciprocal of the second fraction.

Think:  $\frac{1}{4} \times \frac{4}{1} = 1$ .

The reciprocal of  $\frac{1}{4}$  is  $\frac{4}{1}$ .

**Step 2** Write a multiplication problem using the reciprocal of the second fraction.

$$\frac{4}{5} \div \frac{1}{4} = \frac{4}{5} \times \frac{4}{1}$$

**Step 3** Multiply.

$$\frac{4}{5} \times \frac{4}{1} = \frac{16}{5}$$

**Step 4** Simplify.

$$\frac{16}{5} = 3\frac{1}{5}$$


So,  $\frac{4}{5} \div \frac{1}{4} = 3\frac{1}{5}$ .

## Lesson 2.8

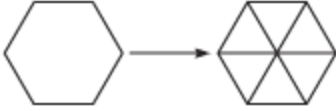
### Model Mixed Number Division

Use pattern blocks to find the quotient of  $3\frac{1}{2} \div \frac{1}{6}$ .

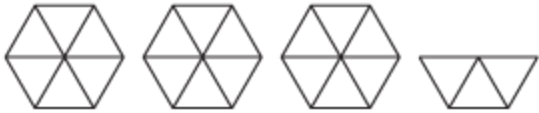
**Step 1** Model 3 with 3 hexagon blocks.  
Model  $\frac{1}{2}$  with 1 trapezoid block.



**Step 2** Find a block that shows  $\frac{1}{6}$ .  
6 triangle blocks are equal to 1 hexagon.  
So, a triangle block shows  $\frac{1}{6}$ .



**Step 3** Cover your model with triangle blocks.  
Count the triangles.  
There are 21 triangle blocks.



So,  $3\frac{1}{2} \div \frac{1}{6} = 21$ .

## Lesson 2.9

### Divide Mixed Numbers

To divide mixed numbers, first rewrite the mixed numbers as fractions greater than 1. Then multiply the dividend by the reciprocal of the divisor.

Find the quotient of  $7\frac{1}{2} \div 2\frac{1}{2}$ . Write it in simplest form.

**Step 1** Write the mixed numbers as fractions.

$$7\frac{1}{2} \div 2\frac{1}{2} = \frac{15}{2} \div \frac{5}{2}$$

**Step 2** Use the reciprocal of the divisor to write a multiplication problem.

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

**Step 3** Simplify. Look for common factors in the numerators and denominators. Divide out the common factors.

$$= \frac{\overset{3}{\cancel{15}}}{\underset{1}{\cancel{2}}} \times \frac{\underset{2}{\cancel{2}}}{\overset{1}{\cancel{5}}}$$

**Step 4** Multiply and simplify the product.

$$= \frac{3}{1} = 3$$

So,  $7\frac{1}{2} \div 2\frac{1}{2} = 3$ .

More information on this strategy is available on Animated Math Model #11.

## Lesson 2.10

### Problem Solving • Fraction Operations

Draw a model to solve the problem.

Naomi cuts a  $\frac{3}{4}$ -foot paper roll into sections, each  $\frac{1}{16}$  foot long. If she discards  $\frac{1}{8}$  foot of the roll, how many sections does she still have?

Read the Problem	Solve the Problem
<p><b>What do I need to find?</b></p> <p>The number _____</p> <p>_____</p>	<p>Draw a model to solve the problem.</p> <div style="text-align: center;"> <p style="font-size: small;">1 foot</p> <p style="font-size: x-small;"> <math>\frac{1}{4}</math>   <math>\frac{1}{4}</math>   <math>\frac{1}{4}</math>   <math>\frac{1}{4}</math>  <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math>   <math>\frac{1}{8}</math> </p> </div>
<p><b>What information do I need to use?</b></p> <p>Naomi starts with _____</p> <p>_____</p> <p>Each section is _____</p> <p>She discards _____</p>	
<p><b>How will I use the information?</b></p> <p>I will _____</p> <p>to find _____</p> <p>_____</p>	

### Vocabulary

**Multiplicative inverse** – one of two numbers whose product is 1

**Reciprocal** – one of two numbers whose product is 1

**Repeating decimal** – a decimal number that has a block of one or more digits that repeat continuously (where all digits in the block are not zero)

**Terminating decimal** – a decimal number that ends, or terminates

**Benchmark** – a familiar number used as a point of reference

**Compatible numbers** – numbers that are easy to compute with mentally

**Common denominator** – a common multiple of the denominators or two or more fractions

**Equivalent fractions** – two or more fractions that name the same amount

**Mixed number** – a number represented by a whole number and a fraction

**Simplest form** – a fraction in which 1 is the only number that can divide evenly into the numerator and the denominator