

## LESSON 2 – INTRODUCTION TO FRACTIONS

### INTRODUCTION

In this lesson, we will work again with factors and also introduce the concepts of prime and composite numbers. We will then begin working with fractions and the concept of “parts of a whole”.

The table below shows the specific objectives that are the achievement goal for this lesson. Read through them carefully now to gain initial exposure to the terms and concept names for the lesson. Refer back to the list at the end of the lesson to see if you can perform each objective.

Lesson Objective	Related Examples
Find all <i>factors</i> of a number.	1, YT4
Write the <i>prime factorization</i> for a <i>composite number</i> .	2, YT5
Find the <i>LCM</i> (Least Common Multiple) of two numbers.	3
Recognize a fraction as part of a whole.	6
Identify fractions represented by shading.	6
Write <i>mixed numbers</i> as <i>improper fractions</i> .	9, YT10, YT14
Write <i>improper fractions</i> as <i>mixed numbers</i> .	11, YT12, YT13
Find <i>equivalent fractions</i> .	15, 16, YT18
Write fractions in simplest form.	17, YT 18, YT19
<i>Compare</i> fractions.	20
Graph fractions on a number line.	21
Simplify fractions that have a “1” in the numerator or denominator.	22
Simplify fractions that have a “0” in the numerator or denominator.	22
Solve <i>applications</i> with fractions.	23, YT24

### KEY TERMS

The key terms listed below will help you keep track of important mathematical words and phrases that are part of this lesson. Look for these words and circle or highlight them along with their definition or explanation as you work through the MiniLesson.

- Factors
- Prime Number
- Composite Number
- Prime Factorization
- Exponential Form
- Factored Form
- Least Common Multiple (LCM)
- Fraction
- Numerator
- Denominator
- Proper Fraction
- Improper Fraction
- Mixed Number
- Quotient
- Remainder

### LESSON CHECKLIST

Use this page to track required components for your class and your progress on each one.

Component	Required? Y or N	Comments	Due	Score
Mini-Lesson				
Online Homework				
Online Quiz				
Online Test				
Practice Problems				
Lesson Assessment				

## MINILESSON

## FACTORS

The *factors* of a number divide the number evenly (with remainder zero).



**Example 1:** Find all factors of 24.

## PRIME FACTORIZATION

A *prime number* is a whole number that has only itself and 1 as factors.

(Example: 2, 3, 5, 7, 13, 29, etc...)

A *composite number* is a whole number that is not prime (i.e. has factors other than itself and 1). Every composite number can be written as a product of prime factors. This product is called the *prime factorization*.



**Example 2:** Find the prime factorization of each of the following. Write the final result in *exponential form* and *factored form*.

72

600

## LEAST COMMON MULTIPLE (LCM)



**Example 3:** The *LCM* of two numbers is the smallest number for which both numbers are factors. For example, the LCM of 2 and 4 is 4. The LCM of 3 and 5 is 15. Find the LCM of 8 and 10:

Multiples of 8 are: \_\_\_\_\_

Multiples of 10 are: \_\_\_\_\_

Some common multiples of 8 and 10 are: \_\_\_\_\_

The LEAST COMMON MULTIPLE of 8 and 10 is \_\_\_\_\_

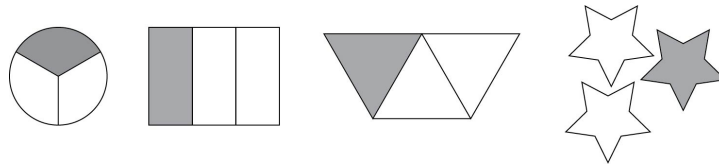
YOU TRY

4. List the factors of 18. 5. Find the prime factorization of 270.

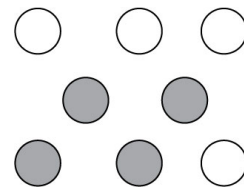
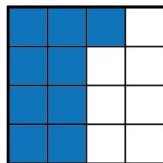
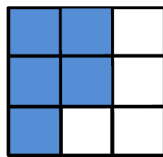
FRACTIONS

Suppose I buy a candy bar to split with two of my friends. What number could we use to discuss how much of the bar each of us would get? Well, if we have 1 bar and it is split into 3 equal pieces, then we would say that each person gets  $\frac{1}{3}$  of the bar. The number  $\frac{1}{3}$  is called a *fraction* because we use it to represent part (one part) of a whole (3 pieces).

The fraction  $\frac{1}{3}$  can be represented by the shaded part in each of the following diagrams. Notice that in each diagram, the whole is a different shape or set of shapes but the use of the fraction  $\frac{1}{3}$  still applies.



**Example 6:** Identify the fraction represented by the shaded part of each figure.



YOU TRY

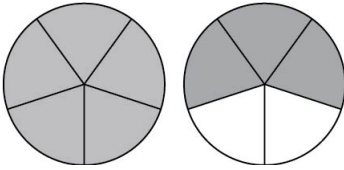
7. Draw two different figures or sets of figures that are  $\frac{3}{4}$  shaded.

Vocabulary of *fractions*:

- The top number in a fraction is called the *numerator*.
- The bottom number in a fraction is called the *denominator*.
- Fractions for which the top number is smaller than the bottom are called *proper fractions*.
- Fractions whose numerator is larger than the denominator are called *improper fractions* and can be written as what are called *mixed numbers*.



**Example 8:** Identify the fraction represented by the shaded part of each figure.



**Example 9:** Express as an improper fraction.

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

$$12\frac{1}{3}$$

YOU TRY

10. Write the steps to convert a *mixed number* to an *improper fraction* (from video above)



**Example 11:** Express as a mixed number.

a.  $\frac{42}{5}$

b.  $\frac{53}{9}$

c.  $\frac{84}{7}$

## YOU TRY

12. Write the steps to convert an *improper fraction* to a *mixed number* (from video above)

13. Express  $\frac{57}{11}$  as a mixed number.

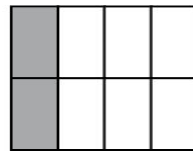
14. Express  $8\frac{1}{5}$  as an improper fraction.

## EQUIVALENT FRACTIONS

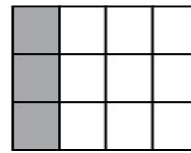
Each rectangle below has the same amount of shaded area. The simplest way to represent the shaded areas as a fraction is as  $\frac{1}{4}$ . All of the listed fractions are equivalent to  $\frac{1}{4}$ .



$$\frac{1}{4}$$



$$\frac{2}{8}$$



$$\frac{3}{12}$$



**Example 15:** Which of the given fractions are equivalent to  $\frac{2}{7}$ ?

$$\frac{4}{14}$$

$$\frac{6}{18}$$

$$\frac{10}{35}$$

$$\frac{14}{28}$$



**Example 16:** Find four fractions equivalent to  $\frac{1}{5}$ .

## FRACTIONS IN SIMPLEST FORM

Fractions are in simplest form if they are completely reduced. To completely reduce a fraction, remove all common factors other than 1 from the numerator and denominator. Leave fraction answers always in simplest form.



**Example 17:** Write the following fractions in simplest form.

$$\frac{4}{16}$$

$$\frac{28}{54}$$

$$\frac{360}{495}$$

## YOU TRY

18. Find two fractions equivalent to  $\frac{3}{8}$ .

19. Write  $\frac{40}{72}$  in simplest form.

## COMPARING FRACTIONS

To compare fractions, create equivalent fractions with the same denominator then compare the numerators.

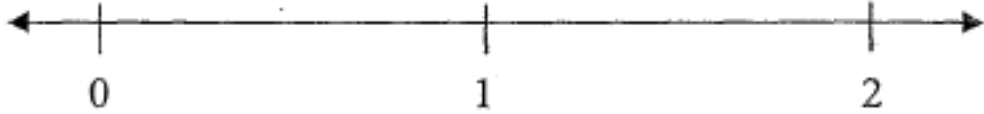


**Example 20:** Which is larger,  $\frac{4}{5}$  or  $\frac{6}{7}$ ?

GRAPHING FRACTIONS ON A NUMBER LINE



**Example 21:** Divide the given line into units of length  $\frac{1}{6}$ , label each tick mark, then plot and label the following numbers:  $\frac{0}{6}, \frac{2}{6}, \frac{5}{6}, \frac{6}{6}, \frac{9}{6}$ . Provide alternate forms if possible.



ONE and ZERO



**Example 22:** Complete the following table.

Number	Computation	Simplified Result	General Rule
$\frac{4}{1}$			
$\frac{4}{4}$			
$\frac{0}{4}$			
$\frac{4}{0}$			



## APPLICATION OF FRACTIONS



**Example 23:** There are 14 men and 12 women in Professor Bohart's MAT082 class. What fraction of the students in the class are women?

GIVEN:

GOAL:

MATH WORK:

CHECK:

FINAL RESULT AS A COMPLETE SENTENCE:

## YOU TRY

24. The local PTA group approved a fall carnival by a vote of 15 to 5. What fraction of the PTA group voted against the bill? Remember to reduce the final result.

GIVEN:

GOAL:

MATH WORK:

CHECK:

FINAL RESULT AS A COMPLETE SENTENCE: