The Half-Time Show (Working with Fractions)

Suggested time: 45 minutes

What's important in this lesson:
It is important for you to work carefully when reducing fractions and to be able to think of the possible combinations that can multiply together to produce a number. You will need to become comfortable working with mixed numbers and converting improper fractions to mixed numbers.

Complete these steps:

1. Read through the Lesson portion of the package independently.
2. Complete the required 'Practice' questions.
3. If you have questions about the examples or the 'Practice' questions seek assistance from the teacher as needed.
4. Use 'Practice' Answer Keys to check your answers as they work through the package. If you are making errors, have your teacher review these questions with you.
5. Complete the Fractions Assignment.

Hand-in the following to your teacher:

1. Practice Problems from the Student Handout.
2. Fractions Assignment

Questions for the teacher:

The Half-Time Show
Working with Fractions

Part A - Lowest Terms

All answers to questions with fractions should be written as SIMPLY as possible.

For example, if you ate 12 slices from a 24-slice cake, you probably wouldn't say:

"I ate **twelve twenty-fourths** of the cake", but rather:

"I ate **half** of the cake"

This second statement is simpler (and more commonly used) than the first.

It is correct, because… $\frac{12}{24} = \frac{1}{2}$

So, how do we find this fraction in **LOWEST TERMS**?

STEP 1) List all FACTORS (numbers that divide into) of 12 and 24:

12 – 1x12, 2x6, 3x4	So, the factors of 12 are **1,2,3,4,6, and 12**
24 – 1x24, 2x12, 3x8, 4x6	So, the factors of 24 are **1,2,3,4,6,8, and 12**

STEP 2) Which is the highest FACTOR in BOTH LISTS? **12**

STEP 3) DIVIDE both the TOP and the BOTTOM of the fraction **by 12:**

$$\frac{12 \div 12}{24 \div 12} = \frac{1}{2}$$

You have just found that $\frac{1}{2}$ is the lowest equivalent fraction to $\frac{12}{24}$.

Example

If I start the day with $20 in my pocket, and I spend $15 of the money, then what fraction have I spent?

Well, the EASY answer is $\frac{15}{20}$, but it isn't the SIMPLEST (or BEST) answer!

STEP 1) LIST FACTORS: 15 – 1x15, 3x5
20 – 1x20, 2x10, 4x5

STEP 2) The highest FACTOR in BOTH LISTS is **5**

STEP 3) DIVIDE:

15 ÷ 5 = 3
20 ÷ 5 = 4

So, I have spent ¾ of the money in my pocket!

Practice Problems

1. Reduce $\frac{10}{15}$ to lowest terms by completing all steps:

STEP 1) LIST FACTORS: 10 –

15 –

STEP 2) Which factor is the highest one found in BOTH lists? _____

STEP 3) Divide by the highest factor:

$\frac{10 \div \_\_\_\_}{15 \div \_\_\_\_} = \frac{\_\_\_\_}{\_\_\_\_}$

2. Reduce $\frac{12}{40}$ to lowest terms by completing all steps:

   STEP 1) LIST FACTORS: 12 –

   40 –

   STEP 2) Which factor is the highest one found in BOTH lists? ___

   STEP 3) Divide by the highest factor:

   $$\frac{12 \div \_\_\_}{40 \div} = \_\_\_\_$$

3. Use the 3-step method shown on the previous page to find all fraction answers (in lowest terms):

   a. Two of the eight people in my family wear glasses. What fraction of people wear glasses?

   b. You have just spent 40 minutes out of a 60-minute period doing math. What fraction of the class have you spent doing math? Express your answer in lowest terms.

Check the answers to these questions before moving on to part B!

Part B - Mixed Numbers

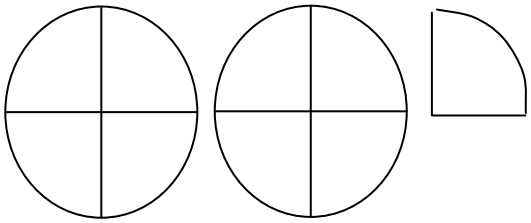
It is useful to be able to express improper fractions as MIXED NUMBERS.

For example, who would say that you and your friends ate $\frac{9}{4}$ of a pizza?

We would more likely hear that you ate 2¼ pizzas!

So, how do we get this MIXED NUMBER?

Using a Diagram



Well let's imagine the 9 slices of pizza.

How big is each slice? (**¼ of a pizza**)

So, 9 of these slices actually makes 2 whole pizzas, plus 1 extra slice → 2¼.

Without a Diagram

$\frac{9}{4}$ means 9 ÷ 4 and

4 x 1 = 4
4 x 2 = 8
4 x 3 = 12

9 fits in here (between 8 and 12)

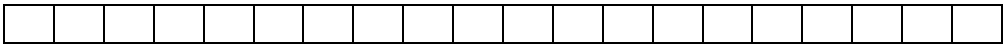
It is 1 more than 8 (4x2),
so 9 ÷ 4 = 2 plus 1 more quarter (remainder)

OR $\frac{9}{4}$ = 2¼

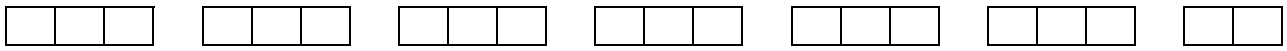
Example

Change $\frac{20}{3}$ to a MIXED NUMBER.

The bars below show the 20 parts



When we divide the 20 parts into groups of 3, we get…



WE have 6 groups of 3, plus 2 left over,… OR 6⅔.

Without a Diagram

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12

5 x 3 = 15
6 x 3 = 18

7 x 3 = 21

20 fits in here since it is 2 more than 18.
20 ÷ 3 = 6 plus 2 more thirds.

OR $\frac{20}{3}$ = 6⅔

Practice Problems

1. Change all fractions to MIXED NUMBERS: Use the space below each question for rough work.

   a. $\frac{7}{2}$ = 7 ÷ 2 = **3** whole plus 1 more = 3½

   b. $\frac{27}{5}$ = 27 ÷ 5 = _____ whole plus _____ more = _____

   c. $\frac{4}{3}$ = 4 ÷ 3 = _____ whole plus _____ more = _____

   d. $\frac{32}{6}$ = 32 ÷ 6 = _____ whole plus _____ more = _____

   = _____ (lowest terms)

   e. $\frac{95}{10}$ = 95 ÷ 10 = _____ whole plus _____ more = _____

   = _____ (lowest terms)

2. When baking a batch of cookies, you find out that you need $\frac{9}{2}$ cups of sugar. How many cups is this?

3. Sue estimates that her book is $\frac{18}{4}$ of an inch long. How long is this?

4. Pieces of paper are cut into thirds. How many pieces of paper were used to make $\frac{10}{3}$?

Check the answers to these questions before moving on!

Fractions Assignment

Make sure all answers are reduced to lowest terms!

1. Reduce the following to lowest terms.
   a. $\frac{15}{24}$ b. $\frac{8}{40}$ c. $\frac{60}{90}$

2. Change each of the following to a MIXED NUMBER.
   a. $\frac{21}{4}$ b. $\frac{38}{10}$ c. $\frac{120}{7}$

3. Jane's birthday is in 9 months. What fraction of a year (12 months) is this?

4. There are 20 t-shirts in Tom's closet. 16 of the shirts are blue. What fraction of Tom's shirts are blue?

5. In order to share a box of donuts fairly, a teacher cuts each donut in half. After everyone has eaten, there are $\frac{25}{2}$ left in the box. How many donuts are left? (Mixed Number)

6. You are baking a cake. The recipe calls for ¼ of a cup of butter. You want to make 14 cakes. How many cups is $\frac{14}{4}$? (as a mixed number)

7. Your pencil is $\frac{125}{10}$ cm long. Change this to a mixed number.