Lesson 11: Ratios of Fractions and Their Unit Rates

Classwork

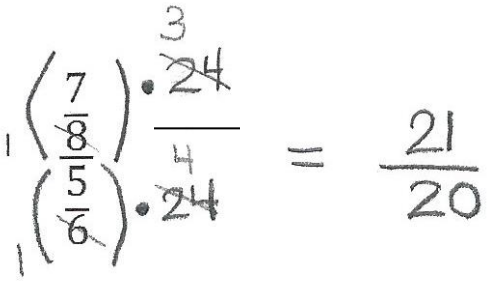
Example 1: Who is Faster?

During their last workout, Izzy ran 2 ¼ miles in 15 minutes and her friend Julia ran 3 ¾ miles in 25 minutes. Each girl thought she were the faster runner. Based on their last run, which girl is correct?

Exercises

1. A turtle walks ⅞ of a mile in 50 minutes. What is the unit rate expressed in miles per hour?

   a. To find the turtle's unit rate, Meredith wrote and simplified the following complex fraction. Explain how the fraction $\frac{5}{6}$ was obtained.



   b. Did Meredith simplify the complex fraction correctly? Explain how you know.

2. For Anthony's birthday his mother is making cupcakes for his 12 friends at his daycare. The recipe calls for 3 ⅓ cups of flour. This recipe makes 2 ½ dozen cookies. Anthony's mother has only 1 cup of flour. Is there enough flour for each of his friends to get a cupcake? Explain and show your work.

3. Sally is making a painting for which she is mixing red paint and blue paint. The table below shows the different mixtures being used.

Red Paint (Quarts)	Blue Paint (Quarts)
$1\frac{1}{2}$	$2\frac{1}{2}$
$2\frac{2}{5}$	4
$3\frac{3}{4}$	$6\frac{1}{4}$
4	$6\frac{2}{3}$
1.2	2
1.8	3

a. What are the unit rates for the values?

b. Is the amount of blue paint proportional to the amount of red paint?

c. Describe, in words, what the unit rate means in the context of this problem.

Lesson Summary:

A fraction whose numerator or denominator is itself a fraction is called a **complex fraction.**

Recall: A unit rate is a rate which is expressed as A/B units of the first quantity per 1 unit of the second quantity for two quantities A and B.

For example: If a person walks 2 ½ miles in 1 ¼ hours at a constant speed, then the unit rate is $\frac{2\frac{1}{2}}{1\frac{1}{4}} = \frac{\frac{5}{2}}{\frac{5}{4}} = \frac{5}{2} \cdot \frac{4}{5} = 2$. The person walks 2 mph.

Problem Set

1. Simplify: $2\frac{4}{7} \div 1\frac{3}{6}$

2. One lap around a dirt track is $\frac{1}{3}$ mile. It takes Bryce $\frac{1}{9}$ hour to ride one lap. What is Bryce's unit rate around the track?

3. Mr. Gengel wants to make a shelf with boards that are $1\frac{1}{3}$ feet long. If he has an 18 foot board, how many pieces can he cut from the big board?

4. The local bakery uses 1.75 cups of flour in each batch of cookies. The bakery used 5.25 cups of flour this morning.
   a. How many batches of cookies did the bakery make?

   b. If there are 5 dozen cookies in each batch, how many cookies did the bakery make yesterday?

5. Jason eats 10 ounces of candy in 5 days.
   a. How many pounds will he eat per day? (16 ounces = 1 pound)

   b. How long will it take Jason to eat 1 pound of candy?