

Lesson 11: Ratios of Fractions and Their Unit Rates

Classwork

Example 1: Who is Faster?

During their last workout, Izzy ran $2\frac{1}{4}$ miles in 15 minutes and her friend Julia ran $3\frac{3}{4}$ miles in 25 minutes. Each girl thought she was the faster runner. Based on their last run, which girl is correct? Use any approach to find the solution.

Tables

Izzy

mins	hrs	distance (mi)	rate
15	$\frac{15}{60} = \frac{1}{4}$	$2\frac{1}{4}$	$\frac{2\frac{1}{4}}{\frac{1}{4}} = 9 \text{ mph}$
30	$\frac{30}{60} = \frac{1}{2}$	$4\frac{1}{2}$	
45	$\frac{45}{60} = \frac{3}{4}$	$6\frac{3}{4}$	
60	$\frac{60}{60} = 1$	9	
75	$\frac{75}{60} = 1\frac{1}{4}$	$11\frac{1}{4}$	

Julia

mins	hrs	distance	rate
25	$\frac{25}{60} = \frac{5}{12}$	$3\frac{3}{4}$	$\frac{3\frac{3}{4}}{\frac{5}{12}} = 9 \text{ mph}$
50	$\frac{50}{60} = \frac{5}{6}$	$7\frac{1}{2}$	
75	$\frac{75}{60} = 1\frac{1}{4}$	$11\frac{1}{4}$	
100	$\frac{100}{60} = 1\frac{2}{3}$	15	

Both girls run at the same speed.

equation

Izzy

$$d = r t$$

$$\left(\frac{4}{1}\right) \times 2\frac{1}{4} = r \cdot \frac{1}{4} \left(\frac{4}{1}\right)$$

$$9 = r$$

Julia

$$d = r t$$

$$\left(\frac{12}{5}\right) \times 3\frac{3}{4} = r \left(\frac{5}{12}\right) \times \left(\frac{12}{5}\right)$$

$$9 = r$$

Example 2: Is Meredith Correct?

A turtle walks $\frac{7}{8}$ 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 the following complex fraction. Explain how the fraction $\frac{5}{6}$ was obtained.

$$\frac{\left(\frac{7}{8}\right)}{\left(\frac{5}{6}\right)}$$

The $\frac{5}{6}$ represents the fraction of an hour that the turtle can walk $\frac{7}{8}$ of a mile in.

$$\frac{50}{60} = \frac{5}{6}$$

- b. Determine the unit rate, expressed in miles per hour.

$$\frac{\left(\frac{7}{8}\right)}{\left(\frac{5}{6}\right)} = \frac{1}{20} \text{ mph}$$

$$\frac{21}{20} \text{ mph}$$

Exercises

1. For Anthony's birthday, his mother is making cupcakes for his 12 friends at his daycare. The recipe calls for $3\frac{1}{3}$ cups of flour. This recipe makes 2 dozen cupcakes. 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.

flour
 $3\frac{1}{3}$ cups

cupcakes
 $2\frac{1}{2}$

unit rate

$$\frac{\text{Cupcakes}}{\text{flour}} = \frac{2\frac{1}{2}}{3\frac{1}{3}} = \frac{3}{4} \text{ dozens or cupcakes per 1 cup of flour}$$

She will not have enough to make 1 dozen (12) cupcakes.