TOPIC 2

LESSON 2.2a

Eggzactly

7.RP.1

Objective

Solving Problmes with Ratios of Fractions

Warm-Up

Determine each product or quotient.

1. $\frac{1}{2} \times \frac{3}{5}$

2. $\frac{5}{8} \times \frac{8}{5}$

3. $\frac{2}{3} \div \frac{3}{8}$

4. $\frac{3}{4} \div 1\frac{1}{2}$

GETTING STARTED

A Different Form, But Still the Same

Ratios can be written using any numbers. A ratio in which one or both of the quantities being compared are written as fractions is called a complex ratio.

For example, traveling $\frac{1}{3}$ mile in $\frac{1}{2}$ hour represents a ratio of fractions, or a complex ratio. It is also an example of a rate, since the units being compared are different.

You can write this ratio in fractional form: $\frac{\frac{1}{3}}{\frac{1}{2}}$

1. Rewrite each given rate as an equivalent ratio of fractions, or complex ratio, by converting one or both units of measure.

a. One half-inch of rain fell in fifteen minutes.

b. Sam ran 3520 feet in 20 minutes.

c. The baby gained 6 ounces every week.

d. Gas costs $2.50 per gallon.

EXPLORE 1

Comparing Ratios of Fractions

The table shows the weights of four different adult birds and the weights of their eggs.

	Mother's Weight (oz)	Egg Weight (oz)
Pigeon	**10**	$\frac{3}{4}$
Chicken	**80**	**2**
Swan	**352**	**11**
Robin	$2\frac{1}{2}$	$\frac{1}{10}$

1. Compare the weights of the eggs. List the birds in order from the bird with the heaviest egg to the bird with the lightest egg.

2. Determine the ratio of egg weight to mother's weight for each bird.

3. Compare the ratios of egg weight to mother's weight.
List the birds in order from greatest to least ratio.

EXPLORE 2

Determining Unit Rates from Ratios of Fractions

Although the ostrich is the largest living bird, it is also the fastest runner. The table shows distances that four birds ran, and the amount of time it took each bird to run that distance.

Bird	Distance Covered	Time
Ostrich	22 miles	$\frac{1}{2}$ hour
Greater Roadrunner	300 yards	$\frac{1}{2}$ minute
Quail	20 yards	$2\frac{1}{2}$ seconds
Pheasant	200 yards	$\frac{5}{6}$ minute

Each row in the table shows a rate. The rate for each bird in this situation is the distance covered per the amount of time.

1. Write the rate for each bird as a complex rate.

a. Ostrich

b. Greater Roadrunner

c. Quail

d. Pheasant

The rates you wrote in Question 1 are each represented using different units of measure. In order to compare speeds let's determine the unit rate in miles per hour for each bird. Consider the numbers and units of the original rate to choose a strategy. Analyze each worked example.

You know that the ostrich ran 22 miles in $\frac{1}{2}$ hour

WORKED EXAMPLE

The rate of the ostrich is already measured in miles and hours. You can set up a proportion and scale the original rate up to 1 hour.

$$\frac{\text{distance}}{\text{time}} \longrightarrow \frac{22 \text{ mi}}{\frac{1}{2} \text{ h}} \overset{\times 2}{=} \frac{44 \text{ mi}}{1 \text{ h}}$$

$$= \frac{44 \text{ mi}}{1 \text{ h}}$$

The ostrich's speed is 44 miles per hour.

2. Why was the scale factor of 2 used in this worked example?

You know that the Greater Roadrunner ran 300 yards in $\frac{1}{2}$ minute.

WORKED EXAMPLE

The rate of the Greater Roadrunner is written in yards per minute. You can use conversion rates to rewrite the rate in miles per hour.

$$\frac{300 \text{ yd}}{\frac{1}{2} \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{1 \text{ mi}}{1760 \text{ yd}}$$

$$\frac{300 \cancel{\text{yd}}}{\frac{1}{2} \cancel{\text{min}}} \cdot \frac{60 \cancel{\text{min}}}{1 \text{ hr}} \cdot \frac{1 \text{ mi}}{1760 \cancel{\text{yd}}}$$

$$\frac{300}{\frac{1}{2}} \cdot \frac{60}{1} \cdot \frac{1}{1760} \frac{\text{mi}}{\text{hr}}$$

$$600 \cdot 60 \cdot \frac{1}{1760} \frac{\text{mi}}{\text{hr}} \approx \frac{20.5 \text{ mi}}{1 \text{ hr}}$$

3. Why is the fractional representation of each conversion rate important?

4. Determine the quail's and pheasant's speeds in miles per hour.

a. quail's speed:

b. pheasant's speed:

5. Write the birds in order from the fastest rate to the slowest rate

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 2.2a
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Objective

Solving Problems with Ratios of Fractions

Solve.

1. Sasha can mow $\frac{3}{8}$ of an acre of grass in 45 minutes. How many acres of grass does Sasha mow per hour?

_____

2. Ammar hikes $2\frac{3}{4}$ miles of nature trail in 1 hour and 15 minutes. How many miles of trail does Ammar hike per hour?

_____

3. Melinda paints $\frac{7}{8}$ of a wall in $1\frac{1}{6}$ hours. What part of a wall does Melinda paint in 1 minute?

_____

4. There is $\frac{1}{4}$ ounce of yeast in every $2\frac{1}{4}$ teaspoons of yeast. A recipe for bread calls for 2 teaspoons of yeast. How many ounces of yeast are needed for this recipe?

_____

5. Every $5\frac{1}{2}$ cups of flour weighs $1\frac{9}{16}$ pounds. Use a unit rate to show how you could determine if there are more than or less than 35 cups of flour in a 10-pound bag of flour.

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