

# Ratios

November 28, 2016

Mr. Collin



# Announcements

- Welcome back!
- We will start chapter 5 (ratios and proportions) today
- The summative test for this chapter will be in January
  - That means the only way to raise your grade before the end of the semester is to retake summatives



# New Unit

- Ratios, Proportions, and Similar Figures
- **Ratio**
  - The relative size or amount between two values



# Ratios

- We can use ratios to describe the relative size of any two numbers
- What is the ratio of boys to girls in this classroom?
- What fraction of the students in this room is girls?



# In-Class Project

- I will put you into groups of three or four
- We will use an online tool to practice using ratios:

[http://www.scholastic.com/unexpecte  
dmath/ratio-  
challenge/activity.htm?theme=park](http://www.scholastic.com/unexpecte<br/>dmath/ratio-<br/>challenge/activity.htm?theme=park)

# **Unit Rates**

**November 29, 2016**

**Mr. Collin**



# Warmup

$$6:15:21 \rightarrow 2:5:7$$

- 1) If there are 6 green marbles, 15 black marbles, and 21 red marbles in a bag, what is the ratio of green to black to red marbles?
- 2) A bag contains 25 marbles. Ten are blue and the rest are white. What is the ratio of blue to white marbles?

$$2:3$$



# Trade and Grade

- If you received a stamp, you will trade your homework with the person sitting next to you (or someone else near you)
- When you get another person's homework, write your name in the "Corrected By" line at the bottom





# Trade and Grade

1) 3:4

2) 2:1

3)  $\frac{3}{5}$

4)  $\frac{1}{6}$

5) 1:2

6)  $\frac{1}{49}$

7)  $x^9$

8)  $\frac{1}{m^2}$

9)  $z^{12}$

10) 40 grams

11)  $9.3 \times 10^{15}$



# Trade and Grade

- If six or more answers are correct and there is a stamp on the page, write “4” in the score box
- If five or fewer answers are correct, then write “2” in the score box



# Unit Rates

- A unit rate can be thought of as a ratio that compares two completely different things
- Examples: miles per hour, pounds per square inch



# Unit Rates

- If a person drives 300 miles in six hours, what is their average speed?

$$\frac{300 \text{ miles}}{6 \text{ hours}} = \div 6 \quad \frac{50 \text{ miles}}{1 \text{ hour}}$$



# Rates

- Let's practice one
- Find your pulse (either on your wrist or neck) and count the number of beats in 15 seconds
- How many minutes is 15 seconds?

Handwritten red numbers: 21, 18, 22, 24, 20, 20, 19, 18, 14



# Rates

- To find the number of beats per minute, divide the number of beats you counted by  $\frac{1}{4}$
- Remember how to divide by a fraction?

$$20 \div \frac{1}{4} = 20 \times 4 = 80 \text{ bpm}$$



# Be Careful!

- Make sure you divide in the right order
- In 2 hours, you drive 120 miles. What is your speed in miles per hour?

$$120 \div 2 = 60 \text{ mph}$$



# Be Careful!

- A per B
  - Always divide  $A \div B$ , not  $B \div A$
- If you want to find miles per hour, divide number of miles divided by number of hours





## Try Another One

A new car is tested for fuel efficiency. Its gas tank holds 10 gallons of gas and it is able to drive 380 miles on a full tank. What is its fuel efficiency in miles per gallon?

$$\frac{380 \text{ miles}}{10 \text{ gallons}} = \frac{38 \text{ mi.}}{1 \text{ gal.}}$$

380 miles ÷ 10 gallons



# Using Rates

The car we just described can go 38 miles per gallon. If you have four gallons of gas left in your tank, how far can you drive?



## Now You Try

An world-class marathon runner can run about five minutes per mile. At this rate, how long will it take him to run a marathon, which is 26.2 miles?

$$\frac{5 \text{ min}}{1 \text{ mi.}} \times \frac{26.2 \text{ mi.}}{1} = 131 \text{ min.}$$

$$\textcircled{2:11}$$



# Put It All Together

A secretary can type 153 words in 3 minutes. How many words can the same secretary type in 10 minutes?

$$\frac{153 \text{ words}}{3 \text{ min.}} \times \frac{10 \text{ min.}}{1} = 510 \text{ wds}$$

# **Complex Fractions**

**November 30, 2016**

**Mr. Collin**



# Warmup

- 1) If you take two minutes to run one lap around the track, how long will it take you to run four laps? *8 mins.*
- 2) If an employee can pack 30 boxes in 20 minutes, how many boxes can they pack in one hour?



# Trade and Grade

- If you received a stamp, you will trade your homework with the person sitting next to you (or someone else near you)
- When you get another person's homework, write your name in the "Corrected By" line at the bottom



# Trade and Grade

1) 30 m/s

2) 200

3) 10 m/s

4) 1000 ft/s

5) 30

6)  $1\frac{1}{8}$

7)  $\frac{27}{80}$

8)  $\frac{8}{5}$

9)  $\frac{3}{2}$

10)  $\frac{8}{3}$

11)  $\frac{4}{9}$

12)  $\frac{9}{4}$





# Trade and Grade

- If six or more answers are correct and there is a stamp on the page, write “4” in the score box
- If five or fewer answers are correct, then write “2” in the score box



# Complex Fractions

- On Tuesday, we took our pulse and divided it by a fraction to get our heart rate
- Dividing fractions can be written as a “complex fraction”



# Complex Fraction

- A complex fraction is a fraction that has another fraction in the numerator and/or denominator

$$\frac{\frac{3}{5}}{\frac{2}{7}}$$

*Same thing as*

$$\frac{3}{5} \div \frac{2}{7}$$



# Complex Fraction

- One way we can simplify a complex fraction is to multiply by a common denominator

$$\frac{\frac{2}{\cancel{3}}}{6} \times \cancel{3} \quad \frac{2}{18} \rightarrow \left( \frac{1}{9} \right)$$



# Let's Try One More

Simplify the following complex fraction

$$\frac{\frac{4}{\cancel{5}}}{\frac{3}{\cancel{10}}} \quad \begin{array}{l} \times \cancel{10}^2 \\ \times \cancel{10} \end{array} = \frac{8}{3}$$



# Now You Try

Evaluate the following. You may use whichever method you find easier

1)  $\frac{\frac{2}{3} \times \frac{3}{1} - 2}{5 \times 3 - 15}$

2)  $\frac{7}{\frac{1}{3}}$

3)  $\frac{\frac{4}{9}}{\frac{1}{3}}$

4)  $\frac{2}{\frac{4}{9}}$



# Rates

- Let's put together what we have done this week
- Let's do a problem that will use both rates and fractions



# Rates

- Let's say you can ride your bike  $5\frac{1}{2}$  miles in  $\frac{3}{4}$  hour
  - How do you find your average rate in miles per hour?

$$\text{---} \div \text{---}$$

$$\begin{array}{r} \frac{11}{2} \times 2 \\ \hline 22 \end{array} \quad \frac{22}{3} \quad \left( 7\frac{1}{3} \right)$$





## Now You Try

- You are making costumes for a play and buy  $3\frac{1}{2}$  yards of fabric for \$21. What is the cost of fabric per yard?

$$\begin{array}{r} 21 \times 2 \\ \hline 7 \end{array} \quad \begin{array}{r} 42 \\ \hline 7 \end{array} \quad \text{\$6}$$

*(Note: The handwritten work shows a crossed-out  $21 \times 2$  and a  $7$  below it, and a circled  $\$6$ .)*



# Using Rates

- If you can ride your bike  $7\frac{1}{3}$  miles per hour, how far can you ride in  $1\frac{1}{2}$  hours?

$$\frac{22 \text{ miles}}{3 \text{ hours}} \times \frac{3 \text{ hours}}{21}$$

11 miles



# Now You Try

- You can ride your bike  $6\frac{1}{2}$  miles in two-thirds of an hour. How fast are you riding?

$$\frac{\frac{13}{2}}{\frac{2}{3}} = \frac{39}{4}$$

- At that speed, how far would you ride in  $1\frac{1}{3}$  hours?

13 miles

$$\frac{39}{4} \times \frac{4}{3}$$

# **Complex Fractions**

**December 2, 2016**

**Mr. Collin**



# Warmup

Simplify the following:

1)  $\frac{5}{1} \times 6 = \frac{30}{1}$   $\frac{30}{1}$

2)  $\frac{2}{3} \times 3 = \frac{2}{21}$

3)  $\frac{10}{4} \times 5 = \frac{50}{4}$   $\frac{25}{2}$

4)  $\frac{1}{3} \times 3 = \frac{3}{4}$



# Trade and Grade

- If you received a stamp, you will trade your homework with the person sitting next to you (or someone else near you)
- When you get another person's homework, write your name in the "Corrected By" line at the bottom



# Trade and Grade

1)  $1/12$

2) 20

3) 10

4)  $3/5$

5)  $5/12$

6)  $8/3$

7) 12

8) 24

9)  $2n + 4$



# Trade and Grade

- If six or more answers are correct and there is a stamp on the page, write “4” in the score box
- If five or fewer answers are correct, then write “2” in the score box





# Bingo Review

<b>6</b>	<b>30</b>	<b>1</b>	<b>7</b>
<b><math>\frac{5}{12}</math></b>	<b>24</b>	<b><math>5\frac{1}{2}</math></b>	<b>700</b>
<b>40</b>	<b><math>3\frac{1}{8}</math></b>	<b>-1</b>	<b>5</b>
<b>12</b>	<b>5:4</b>	<b><math>\frac{4}{7}</math></b>	<b>14</b>
<b><math>\frac{3}{2}</math></b>	<b>4900</b>	<b><math>-\frac{2}{3}</math></b>	<b>10</b>
<b><math>\frac{5}{6}</math></b>	<b><math>\frac{3}{8}</math></b>	<b>2</b>	<b>5:9</b>



# Round One

Simplify the following complex fraction:

$$\frac{\frac{1}{6}}{\frac{4}{9}}$$



## Round Two

A runner runs  $2\frac{1}{2}$  miles in two-fifths of an hour. At that pace, how many miles will he run in half an hour?



# Round Three

Evaluate the following:

$$25^{\frac{1}{2}}$$



# Round Four

Simplify the following complex fraction:

$$\frac{\frac{2}{5}}{\frac{7}{10}}$$



# Round Five

Evaluate the following:

$$\left(\begin{array}{c} 2 \\ - \\ 3 \end{array}\right)^{-1}$$



## Round Six

If a person drives 60 miles in  $1\frac{1}{2}$  hours, what is their average speed in miles per hour?



## Round Seven

The world record for eating hot dogs was set by Takeru Kobayashi, who ate 66 hot dogs in 12 minutes. How many did he eat per minute?





# Round Eight

Simplify the following complex fraction

$$\frac{18}{\frac{3}{4}}$$



## Round Nine

If a secretary can type 120 words per minute, how many minutes will it take to type a 720-word document?



# Round Ten

If a person bikes 8 miles in two-thirds of an hour, what is her average speed in miles per hour?



# Round Eleven

A baseball team ends a season with 40 wins and 32 losses. What is the team's ratio of wins to losses?



## Round Twelve

After two days of driving, a trucker has driven 1400 miles. How many miles should he be able to drive in a week at that pace?



# Round Thirteen

A florist sells a dozen roses for \$36.  
What would it cost (in dollars) to buy  
ten roses?



# Round Fourteen

Simplify the following complex fraction:

$$\frac{\frac{3}{8}}{\frac{9}{10}}$$



# Answer Key

1)  $\frac{3}{8}$

2)  $3 - \frac{1}{8}$

3) 5

4)  $\frac{4}{7}$

5)  $\frac{3}{2}$

6) 40

7)  $5\frac{1}{2}$

8) 24

9) 6

10) 12

11) 5:4

12) 4900

13) 30

14)  $\frac{5}{12}$