Find the ratio of boys to girls:

Find the unit rate:

Great gas mileage!

$$\frac{115 \text{ miles}}{5 \text{ gallons}}$$

Solve this proportion:

$$\frac{x}{15} = \frac{8}{20}$$

RATIOS, RATES, AND PROPORTIONS GALORE!!

56 action-packed pages filled with guided notes, worksheets, math poetry, activities, and assessments! A complete unit for mastering ratios, rates, and proportions in two weeks or less!

Instructions for the teacher

Here it is at last – the real deal! Everything you need to introduce students to ratio, rate, unit rate, and proportion concepts and ensure they understand and retain them! This product addresses sixth, seventh, and eighth grade common core standards, but can also be used for advanced fifth grade students. Follow these instructions and use the various materials step-by-step, and your students will not only learn how to solve ratio, rate, and proportion problems, but also discover why we use them and their incredible value and versatility in solving day-to-day real-world problems.

This product is broken up into six different sections:

1. **Ratios** – Includes a warm-up activity, note-taking page, illustrated poetry, and worksheet.
2. **Rates** – Includes a warm-up activity, note-taking page, illustrated poetry, and worksheet.
3. **Proportions** – Includes a two warm-up activities, two note-taking pages, illustrated poetry, and two worksheets.
4. **Proportion Word Problems** - Includes a warm-up activity, note-taking page, and worksheet.
5. **Tricky Rate / Proportion Word Problem Challenge** – An exciting competition that serves as a review for the unit assessment.
6. **Rate / Ratio / Proportion Unit Assessment** (which can also be used as a pre-assessment)

As indicated above, each of the first four of these sections, which eventually ready the students for the final two sections, contains four different worksheets/activities. The recommended implementation process of each of these is described below:

a. The ***Warm-up*** activity. This activity is done at the beginning of the class and serves at least three purposes:

- It gets the students' creative juices flowing, and stimulates their mathematical thinking, thereby readying them for the lesson to come.
- It generates enthusiasm for the topic and for the guided note-taking via a discussion of the students' potential solutions to the problems .
- It serves as an informal pre-assessment, as you walk around the room and observe what the students know and don't know about this particular topic, pitfalls you will need to overcome, etc.

You can either project the warm-up on to a screen and have the students work out solutions on paper, or distribute the warm-up as a worksheet, to be put in the students' math notebook upon completion. In either case, keep the following in mind as you do the warm-up activity:

- Warm-up time should ***not be a time for you to teach the students***, but rather a time to ***see what the students know and how they are thinking***.
- Therefore, you should be using this as an opportunity to ***see what solutions the students offer***, and ***not yet present any solutions yourself***. In some cases, you may not even tell the students the correct answers (keys with correct answers are provided), but just allow them to explain their potential methods of getting to the answers.
- When you feel the creative juices are flowing and the students' curiosity is sufficiently piqued, dive into the guided note-taking activity. You may come back to the warm-up to work the problems using appropriate methods if you choose to after the note-taking.

Instructions for the teacher (continued)

b. The ***Notes*** page. This pictorially illustrated, guided note-taking activity immediately follows the warm-up activity and should be used as follows:

- Distribute copies of the notes page. These pages not only contain lots of information, but also have many strategically placed blanks and/or work areas that need to be filled in by the students.
- Project a copy of the notes page. Work through it with the students. Have them fill in the blanks and/or work the problems with your guidance as you go (a detailed key is provided for each notes page), discussing the concepts as appropriate. The notes page should go into the students' notebooks for reference as they do the worksheets and study for the unit assessment.
- When you feel the students understand the content of the notes page, go directly to the poetry to help further cement the concepts. You may also go back to the warm-up activity and address it using methods learned via the notes page if appropriate.

c. The ***Poetry*** sheet. I have found this illustrated poetry is a key piece to cementing the concepts for the students. For instance, they may seem like they know exactly what makes a rate a rate, but sometimes they do not truly remember the reasons until they recite the poetry.

- Read through the poetry with the students, having them recite it also or repeat it back to you. Address the concepts one more time via the illustrations as you go.
- Give the students a copy of the poetry to put in their notebooks.
- Review the poetry or use some key verses from it as often as necessary as you go through the lessons and review for the unit assessment.
- Some students may memorize the poetry, some may not. If they do so, it will help them prepare for the assessment. If not, simply reciting the poetry will help ensure they have the concepts correctly sorted out as they work through the unit.
- After completing the poetry, dive directly into the worksheet so the students can implement and practice what they have learned

d. The ***Worksheet***. The use here is self-explanatory. The students use the worksheet to practice what they have learned via the warm-up, note taking, and poetry. Students may work on the worksheet either alone or with partners. Detailed keys are provided for you to review the worksheet solutions with the students.

After spending the required amount of time on the warm-ups, notes, poetry, and worksheets for each section (an exact timeline is not provided as timing will vary by class, ability, and level of prior knowledge), move to the ***Tricky Rate / Proportion Word Problem Challenge***. I usually give the students 1 – 1.5 class periods to complete this, usually with partners, and usually for some sort of prize for the winners. I also usually do a couple of "tricky" examples with the students before we start. This activity, which serves as a partial review for the assessment, helps the students realize the level of complexity of problems they can now solve using the concepts they have learned. It also helps to remind the students they must truly ***read*** word problems to successfully tackle them.

All that remains at this point is to do the ***Unit Assessment***. Again, detailed keys are provided.

Good luck in your implementation of **Ratios, Rates, and Proportions Galore!**

Name:_______________ Date: ____________ Class: ___________

Ratio Warm-up

There are 4 girls and 6 boys in Mr. Tolentino's class

Girls Boys

1. Fill in the blanks below:

$$\frac{\text{Number of Girls}}{\text{Number of Boys}} = \underline{\qquad\qquad}$$

$$\frac{\text{Number of Boys}}{\text{Number of Girls}} = \underline{\qquad\qquad}$$

$$\frac{\text{Number of Girls}}{\text{Number of Students}} = \underline{\qquad\qquad}$$

$$\frac{\text{Number of Boys}}{\text{Number of Students}} = \underline{\qquad\qquad}$$

2. If you had to explain to someone what part of the class was boys and what part was girls, which of the comparisons above would you use? Why? ______________________________

____

____

Name:_______________ Date: ____________ Class: ___________

Ratio Warm-up - KEY

There are 4 girls and 6 boys in Mr. Tolentino's class

Girls Boys

1. Fill in the blanks below:

$$\frac{\text{Number of Girls}}{\text{Number of Boys}} = \frac{4}{6} = \frac{2}{3}$$

$$\frac{\text{Number of Boys}}{\text{Number of Girls}} = \frac{6}{4} = \frac{3}{2}$$

$$\frac{\text{Number of Girls}}{\text{Number of Students}} = \frac{4}{10} = \frac{2}{5}$$

$$\frac{\text{Number of Boys}}{\text{Number of Students}} = \frac{6}{10} = \frac{3}{5}$$

2. If you had to explain to someone what part of the class was boys and what part was girls, which of the comparisons above would you use? Why? **Answers will vary. This should be used to springboard into a discussion of what ratios are, the difference between part-to-part and part-to-whole ratios, etc., and should lead directly into the notes on the next page.**

Name:_______________ Date: ___________ Class: __________

Ratio Notes

RATIO = ____

A ratio can be expressed in three ways; in ________ form, using a ___________, or using the word "_____".

Example – Girls and Boys in Mr. Tolentino's Class:

The ratio of girls  to boys  is:

Fraction Form	Using a Colon	Using "To"
______________	________________	_____________

Ratios are easiest to understand and use when they are in ______________ form, so we always ____________ ratios.

Ratios vs. Fractions

Is the ratio in fraction form above actually a fraction? _________

Why or why not? _______________________________________

____

We could turn the **part-to-part** ratio of girls to boys into a **part-to-whole** ratio (fraction) by ________________________________

	Words:		Fraction:		Simplified Fraction:
$\frac{\text{part}}{\text{whole}}$ =	_______	=	_______	=	________

Ratios with different ________ cannot be converted in to fractions. Give four examples of ratios that cannot be converted to fractions:

_______ _______ ________ ________

Name:________________ Date: ____________ Class: ___________

Ratio Notes - KEY

RATIO = **The amount of one quantity compared to the amount of another quantity.**

A ratio can be expressed in three ways; in **fraction** form, using a **colon** , or using the word "**to**".

Example – Girls and Boys in Mr. Tolentino's Class:

The ratio of girls  to boys  is:

Fraction Form	Using a Colon	Using "To"
$\frac{4}{6} \div \frac{2}{2} = \frac{2}{3}$	**4:6 or 2:3**	**4 to 6 or 2 to 3**

Ratios are easiest to understand and use when they are in **simplest** form, so we always **simplify** ratios.

Ratios vs. Fractions

Is the ratio in fraction form above actually a fraction? **NO**

Why or why not? _**Because it compares the PART of the class that is girls to the PART of the class that is boys. (It is a PART-TO-PART ratio, NOT a fraction)**

We could turn the part-to-part ratio of boys to girls into a part-to-whole ratio (fraction) by **Putting the whole class in the denominator!**

	Words:	Fraction:	Simplified Fraction:
$\frac{\text{Part}}{\text{Whole}}$ =	$\frac{\textbf{girls}}{\textbf{girls+boys}}$ =	$\frac{\textbf{4}}{\textbf{10}}$ =	$\frac{\textbf{2}}{\textbf{5}}$

Ratios with different **units** cannot be converted in to fractions. Give four examples of ratios that cannot be converted to fractions:

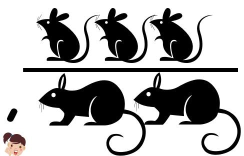
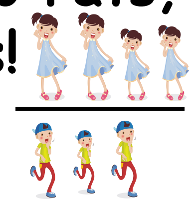
Examples will vary. Discuss ratios vs. fractions at this point.

$\frac{\textbf{desks}}{\textbf{students}}$	$\frac{\textbf{miles}}{\textbf{gallon}}$	$\frac{\textbf{dollars}}{\textbf{hour}}$	$\frac{\textbf{feet}}{\textbf{second}}$

Name:________________ Date: _____________ Class: ____________

Ratio Poetry

A ratio just compares,
One quantity to another.

Like dogs to cats , mice to rats, 
Or your sisters to your brothers! 

Ratios can be written
Three different ways – it's true:

In fraction form $\frac{\text{2 dogs}}{\text{3 cats}}$, with a colon, *3 mice : 2 rats*
Or just using the word, "to". *4 sisters to 3 brothers*

All ratios can look like fractions,
If written with a fraction bar,
But it's only part-to-whole ratios,
That really truly are.

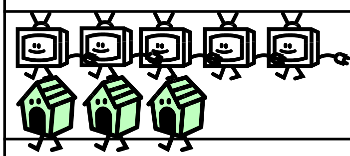
$\frac{\text{2 dogs}}{\text{3 cats}}$ ← ***Not a fraction!***

Fraction! → $\frac{\text{2 dogs}}{\text{5 animals}}$

Name:________________   Date: _____________   Class: ____________

Ratio Worksheet

1. Write each comparison below as a ratio in the three different forms indicated (make sure you convert it to simplest form!). Then answer “yes” or “no” in the last two columns of the table.

Comparison:	**Fraction Form**	**Colon**	**“To”**	**Is a fraction?**	**Can be converted to a fraction?**
1 ball to 6 players					
					
8 boys to 20 class members					
6 A’s to 14 B’s in a class					
60 miles on 3 gallons					
12 completions in 20 pass attempts					
40 gummy bears for $5					
 to 					
6 chipmunks to 7 squirrels					
27 students to 4 teachers					

Name:______________ Date: ___________ Class: __________

Ratio Worksheet (continued)

2. In an orchard, there are 150 orange trees and 250 apple trees.

   a. In simplest fraction form, what is the ratio of orange trees to apple trees? ____________________

   b. In simplest fraction form, what is the ratio of apple trees to orange trees? ____________________

   c. In simplest fraction form, what is the ratio of orange trees to total trees in the orchard? ________________

   d. In simplest fraction form, what is the ratio of apple trees to total trees in the orchard? ________________

   e. Which of the answers to a, b, c, and d above are fractions? ________________

   f. Explain why the answers you listed in question e are fractions:

   ____

   ____

   g. Challenge question: Write each of the answers listed in question e as decimals and percents. SHOW YOUR WORK!

3. Use words to write two different ratios that **can't** be converted to fractions:

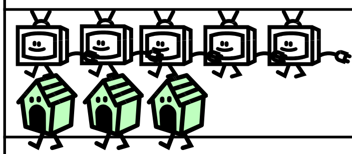
___________________ ____________________

4. The ratio of boys to girls in a class is 4 to 5. There are 20 boys in the class. How many girls are in the class?

Name:________________ Date: ____________ Class: ___________

Ratio Worksheet - KEY

1. Write each comparison below as a ratio in the three different forms indicated (make sure you convert it to simplest form!). Then answer “yes” or “no” in the last two columns of the table.

Comparison:	Fraction Form	Colon	“To”	Is a fraction?	Can be converted to a fraction?
1 ball to 6 players	$\frac{1}{6}$	1:6	1 to 6	NO	NO
	$\frac{5}{3}$	5:3	5 to 3	NO	NO
8 boys to 20 class members	$\frac{8}{20} = \frac{2}{5}$	8:20 or 2:5	8 to 20 2 to 5	YES	YES
6 A’s to 14 B’s in a class	$\frac{6}{14} = \frac{3}{7}$	6:14 or 3:7	6 to 14 3 to 7	NO	YES
60 miles on 3 gallons	$\frac{60}{3} = \frac{20}{1}$	60:3 or 20:1	60 to 3 20 to 1	NO	NO
12 completions in 20 pass attempts	$\frac{12}{20} = \frac{3}{5}$	12:20 or 3:5	12 to 20 3 to 5	YES	YES
40 gummy bears for $5	$\frac{40}{5} = \frac{8}{1}$	40:5 or 8:1	40 to 5 8 to 1	NO	NO
 to 	$\frac{4}{4} = \frac{1}{1}$	4:4 or 1:1	4 to 4 1 to 1	NO	YES
6 chipmunks to 7 squirrels	$\frac{6}{7}$	6:7	6 to 7	NO	YES
27 students to 4 teachers	$\frac{27}{4}$	27:4	27 to 4	NO	YES

Name:_______________ Date: ____________ Class: ___________

Ratio Worksheet (continued) - KEY

2. In an orchard, there are 150 orange trees and 250 apple trees.
   a. In simplest fraction form, what is the ratio of orange trees to apple trees? $\frac{150}{250} = \frac{3}{5}$
   b. In simplest fraction form, what is the ratio of apple trees to orange trees? $\frac{250}{150} = \frac{5}{3}$
   c. In simplest fraction form, what is the ratio of orange trees to total trees in the orchard? $\frac{150}{400} = \frac{3}{8}$
   d. In simplest fraction form, what is the ratio of apple trees to total trees in the orchard? $\frac{250}{400} = \frac{5}{8}$
   e. Which of the answers to a, b, c, and d above are fractions?

      c and d
   f. Explain why the answers you listed in question e are fractions:

      The answers to c and d are fractions because they are PART-TO-WHOLE ratios. The answers to a and b are PART-TO-PART ratios.
   g. Challenge question: Write each of the answers listed in question e as decimals and percents. SHOW YOUR WORK!

      C: 3 ÷ 8 = 0. 375 = 37.5%

      D: 5 ÷ 8 = 0. 625 = 62.5%

3. Use words to write two different ratios that **can't** be converted to fractions:

Answers will vary. Use as discussion point during which you ensure that answers have numerators and denominators with units that cannot be readily combined.

4. The ratio of boys to girls in a class is 4 to 5. There are 20 boys in the class. How many girls are in the class? **Answer is 25 girls. Method is not important at this point. Use this as a checkpoint to see if students are thinking about ratios and ready for proportions.**

Name:_______________ Date: ____________ Class: ___________

Rate Warm-up

1. Satvinder goes to the car dealership to look for a car with his family. On the window of a the first car they test drive, he sees a sign that reads:

Great gas mileage!

$$\frac{\text{115 miles}}{\text{5 gallons}}$$

a. Is the mileage on the sign a ratio? ____________

b. Is the mileage on the sign a fraction? ____________
Why or why not? ________________________________

____

c. Can it be made into a fraction? __________
Why or why not? ________________________________

____

d. Would the information on the sign be easy for a customer to understand? __________
Why or why not? ________________________________

____

e. What could be done with the information on the sign to make it easier to understand for the customer?

____

____

Name:_______________ Date: ____________ Class: ___________

Rate Warm-up - KEY

1. Satvinder goes to the car dealership to look for a car with his family. On the window of a the first car they test drive, he sees a sign that reads:

Great gas mileage!

$$\frac{\text{115 miles}}{\text{5 gallons}}$$

a. Is the mileage on the sign a ratio? **_YES!_It compares one quantity to another.**

b. Is the mileage on the sign a fraction? **__NO!_**

Why or why not? **__Because it is definitely a part-to-part ratio! The denominator does not represent the "whole".**

c. Can it be made into a fraction? **_NO!_**

Why or why not? **_Because miles and gallons cannot be added together to form a part-to-whole ratio.**

d. Would the information on the sign be easy for a customer to understand? **NO**

Why or why not? **Because it does not tell you how many miles the car gets for EACH gallon.**

e. What could be done with the information on the sign to make it easier to understand for the customer?

Answers may vary, but the ideal answer reflects that the student has thought about the fact that it would be easier for the customer to understand the mileage PER GALLON, thereby leading into the notes and discussion of the value of unit rates.

Name:________________ Date: _____________ Class: ____________

Rate Notes

RATIO = ____

RATE = ____

Examples

Ratios that are **not** rates	Ratios that are rates
____________________________	_________________________
____________________________	_________________________
____________________________	_________________________

Rates and Unit Rates

Rates are often most useful if they are written as _________ ________

UNIT RATE = ____

A rate can be converted to a unit rate by ________________________

____

Example

Great gas mileage!

$\frac{\text{115 miles}}{\text{5 gallons}}$

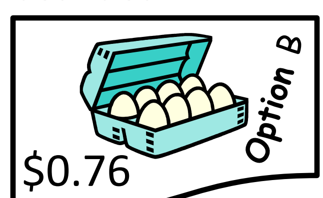
Rate:		Conversion:		Unit Rate:
$\frac{\text{115 miles}}{\text{5 gallons}}$	÷	________	=	$\frac{\text{\_\_\_\_\_\_ miles}}{\text{gallon}}$

Using Unit Rates to Make Comparisons

Unit rates can also be used to easily compare different amounts of the same item:

Example

Use ***unit rates*** to determine which of these is the best deal?



Rate:		Conversion:		Unit Rate:
$\frac{\$\text{\_\_\_\_\_\_}}{\text{eggs}}$	÷	______	=	$\frac{\$\text{\_\_\_\_\_\_}}{\text{egg}}$

Rate:		Conversion:		Unit Rate:
$\frac{\$\text{\_\_\_\_\_\_}}{\text{eggs}}$	÷	______	=	$\frac{\$\text{\_\_\_\_\_\_}}{\text{egg}}$

Option ____ is the better deal!

Name:________________ Date: ____________ Class: ___________

Rate Notes - KEY

RATIO = **The amount of one quantity compared to the amount of another quantity.**

RATE = **A ratio with units that are different enough that it cannot be written as a fraction.**

Examples

Ratios that are **not** rates	Ratios that **are** rates
Boys to girls	**Desks to Students**
A's to B's	**Minutes to Miles**
Cats to dogs	**Hot Dogs per guest**

Rates and Unit Rates

Rates are often most useful if they are written as **unit rates**

UNIT RATE = **A rate with a denominator of ONE.**

A rate can be converted to a unit rate by **dividing the numerator and denominator by the denominator.**

Example

Great gas mileage!

$\frac{115 \text{ miles}}{5 \text{ gallons}}$

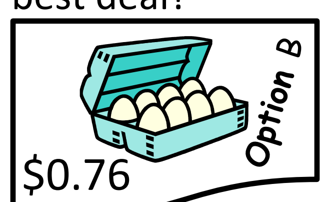
Rate: $\frac{115 \text{ miles}}{5 \text{ gallons}}$ ÷ Conversion: $\frac{5}{5}$ = Unit Rate: $\frac{23 \text{ miles}}{1 \text{ gallon}}$

Using Unit Rates to Make Comparisons

Unit rates can also be used to easily compare different amounts of the same item:

Example

Use ***unit rates*** to determine which of these is the best deal?



Option A — Rate: $\frac{\$1.08}{12 \text{ eggs}}$ ÷ Conversion: $\frac{12}{12}$ = Unit Rate: $\frac{\$0.09}{1 \text{ egg}}$

Option B — Rate: $\frac{\$0.76}{8 \text{ eggs}}$ ÷ Conversion: $\frac{8}{8}$ = Unit Rate: $\frac{\$0.095}{1 \text{ egg}}$

Option A is the better deal!

Name:_______________ Date: ____________ Class: ___________

Rate Poetry

When you need to find a rate,
First do some ratio action,
Cause a rate is just a ratio,
That can't be made into a fraction.

Miles to gallons is a ratio,
But it's called a rate too,
Cause you can't add miles to gallons,
No matter what you do.

$\frac{\text{45 miles}}{\text{3 gallons}} \leftarrow$ *Can't be made into a fraction!*

A unit rate is easy.
And you can get it done.

23 mpg, 60 mph, $\frac{\text{30 ft.}}{\text{1 sec.}}$

Cause a unit rate is just a rate,
Where denominator equals one.

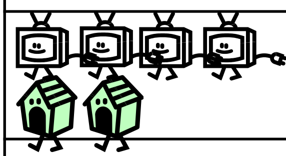
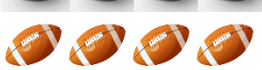
To find a unit rate,
Write in fraction form $\frac{\text{45 miles}}{\text{3 gallons}}$, and later …

Just divide the top and bottom,
By the denominator. $\frac{\text{45 miles}}{\text{3 gallons}} \div \frac{3}{3} = \frac{\text{15 miles}}{\text{1 gallon}}$

Name:________________ Date: _____________ Class: ____________

Rate Worksheet

1. Complete the first three columns of the table with “yes” or “no”. Convert to a unit rate in the fourth column if possible (otherwise write “not possible”). Then answer the last column with “yes” or no”.

Comparison:	Is a ratio?	Is a rate?	Is a unit rate?	Convert to a unit rate here if possible (show work)	Can be converted to a fraction?
6 players to 1 ball					
					
8 boys to 20 class members					
6 A’s to 14 B’s in a class					
60 miles on 3 gallons					
12 completions in 20 pass attempts					
40 gummy bears for $5					
 to 					
6 chipmunks to 7 squirrels					
43 miles per hour					

Name:________________ Date: _____________ Class: ____________

Rate Worksheet (continued)

2. Use unit rates to answer the questions below. Use the first question as an example for how to show your work:

   a. You earn $12 per lawn you mow. If you mow 8 lawns, how much money do you earn?

   $$\frac{\$12}{1\ \cancel{lawn}} \bullet 8\ \cancel{lawns} = \$96$$

   Units cancel! **We are left with dollars!**

   b. You drive 42 miles per hour? How far do you drive in 3 hours?

   c. There are 12 inches per foot. How many inches are there in 14 feet?

   d. There are 2.54 centimeters per inch. How many centimeters are there on a 12-inch ruler?

---

3. Use unit rates to determine which sale is the best deal (**show all work**):

a.

Oranges! **5 for $4**

Oranges! **10 for $9**

Get your oranges here! $0.82 each

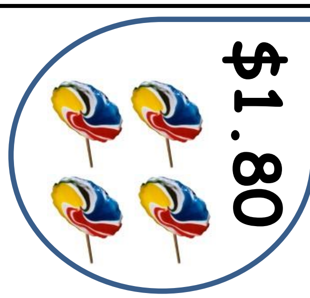
Rate: **Unit Rate:**

$$\frac{\$\_\_\_}{\text{oranges}} \div \_\_ = \frac{\$\_\_\_}{\text{orange}}$$

________________ is the best deal!

---

b.

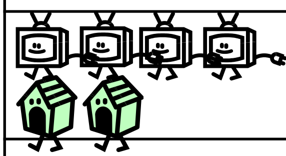


________________ is the best deal!

Name:________________ Date: _____________ Class: ____________

Rate Worksheet - KEY

1. Complete the first three columns of the table with “yes” or “no”. Convert to a unit rate in the fourth column if possible (otherwise write “not possible”). Then answer the last column with “yes” or no”.

Comparison:	Is a ratio?	Is a rate?	Is a unit rate?	Convert to a unit rate here if possible (show work)	Can be converted to a fraction?
6 players to 1 ball	YES	YES	YES	6 players to 1 ball	NO
	YES	YES	NO	$\frac{TVs}{House} = \frac{4}{2} \div \frac{2}{2} = \frac{2}{1}$	NO
8 boys to 20 class members	YES	NO	NO	not possible	YES
6 A’s to 14 B’s in a class	YES	NO	NO	not possible	YES
60 miles on 3 gallons	YES	YES	NO	$\frac{miles}{gallons} = \frac{60}{3} \div \frac{3}{3} = \frac{20}{1}$	NO
12 completions in 20 pass attempts	YES	NO	NO	not possible	YES
40 gummy bears for $5	YES	YES	NO	$\frac{bears}{\$} = \frac{40}{5} \div \frac{5}{5} = \frac{8}{1}$	NO
 to 	YES	NO	NO	not possible	YES
6 chipmunks to 7 squirrels	YES	NO	NO	not possible	YES
43 miles per hour	YES	YES	YES	43 miles per hour	NO

Name:________________ Date: _____________ Class: ____________

Rate Worksheet (continued) - KEY

2. Use unit rates to answer the questions below. Use the first question as an example for how to show your work:

a. You earn $12 per lawn you mow. If you mow 8 lawns, how much money do you earn?

$$\frac{\$12}{1\ \cancel{lawn}} \bullet 8\ \cancel{\text{lawns}} = \$96$$

Units cancel! **We are left with dollars!**

b. You drive 42 miles per hour? How far do you drive in 3 hours?

$$\frac{42\ miles}{1\ \cancel{hour}} \bullet 3\ \cancel{\text{hours}} = 126 \text{ miles}$$

c. There are 12 inches per foot. How many inches are there in 14 feet?

$$\frac{12\ inches}{1\ \cancel{foot}} \bullet 14\ \cancel{\text{feet}} = 168 \text{ inches}$$

d. There are 2.54 centimeters per inch. How many centimeters are there on a 12-inch ruler?

$$\frac{2.54\ cm}{1\ \cancel{in}} \bullet 12\ \cancel{\text{in}} = 30.48 \text{ cm}$$

---

3. Use unit rates to determine which sale is the best deal (**show all work**):

a.

Oranges! 5 for $4

Oranges! 10 for $9

Get your oranges here! $0.82 each

Rate: / **Unit Rate:**

$$\frac{\$4}{5 \text{ oranges}} \div \frac{5}{5} = \frac{\$0.80}{1 \text{ orange}}$$

Rate: / **Unit Rate:**

$$\frac{\$9}{10 \text{ oranges}} \div \frac{10}{10} = \frac{\$0.90}{1 \text{ orange}}$$

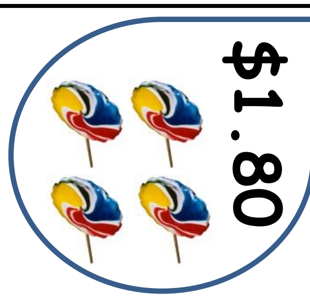
Unit Rate:

$0.82 per orange

_5 for $4________ is the best deal!

---

b.



Rate: / **Unit Rate:**

$$\frac{\$1.50}{3 \text{ lollipops}} \div \frac{3}{3} = \frac{\$0.50}{1 \text{ lollipop}}$$

$$\frac{\$1.80}{4 \text{ l.p.}} \div \frac{4}{4} = \frac{\$0.45}{1 \text{ l.p.}}$$

$$\frac{\$4.60}{10 \text{ l.p.}} \div \frac{10}{10} = \frac{\$0.46}{1 \text{ l.p.}}$$

4 for $180 is the best deal!

Name:_______________ Date: ____________ Class: ___________

Proportion Warm-up

1. Which of these pairs of ratios are equivalent?
   Insert an “=” sign between the equivalent pairs. Insert a “≠” sign between the pairs that are not equivalent.

a. $\frac{2}{3}$ $\quad$ $\frac{4}{6}$ b. $\frac{9}{12}$ $\quad$ $\frac{27}{36}$ c. $\frac{9}{15}$ $\quad$ $\frac{16}{20}$ d. $\frac{3.5}{6}$ $\quad$ $\frac{5.25}{9}$ e. $\frac{22}{55}$ $\quad$ $\frac{16}{40}$

Name:_______________ Date: ____________ Class: ___________

Proportion Warm-up - KEY

1. Which of these pairs of ratios are equivalent?
   Insert an “=“ sign between the equivalent pairs. Insert a “≠” sign between the pairs that are not equivalent.

a. $\frac{2}{3} = \frac{4}{6}$ b. $\frac{9}{12} = \frac{27}{36}$ c. $\frac{9}{15} \neq \frac{16}{20}$ d. $\frac{3.5}{6} = \frac{5.25}{9}$ e. $\frac{22}{55} = \frac{16}{40}$

Remember, this is a “warm-up”. You are not explaining how to do these problems yet, just determining if the students are thinking creatively. You should ***see what solutions the students come up with***, allow for some discussion about how and why they came up with their answers, not give the correct answers yet, go through the Proportion Notes, then come back to the warm-up and use established methods if appropriate and if time allows at that point.

Name:________________ Date: _____________ Class: ____________

Proportion Notes

RATIO = ____

RATE = ____

UNIT RATE = ____

PROPORTION = ____

Proportion Examples

$\frac{2}{5} = \frac{8}{20}$ $\qquad$ $\frac{400\ calories}{1\ burger} = \frac{1200\ calories}{3\ burgers}$ $\qquad$ $\frac{16}{20} = \frac{44}{55}$

Proportions are almost always written in ____________ form.

Checking for Proportions:

You can determine if two ratios form a proportion using two methods:

Method 1 – Simplify Both

$\frac{16}{40} \div \frac{}{} = \frac{}{}$

$\frac{20}{50} \div \frac{}{} = \frac{}{}$

So $\frac{16}{40}$ $\frac{20}{50}$ is a ______________

Method 2 – Cross Products

$\frac{16}{40} = \frac{20}{50}$

40 · 20 ? 50 · 16

_____ = _____

So $\frac{16}{40}$ $\frac{20}{50}$ is a ______________

Checking for Proportions – Practice Problems:

Determine whether each of the pairs of ratios forms a proportion:

a. $\frac{2}{6}$ $\frac{8}{24}$

b. $\frac{6}{10}$ $\frac{9}{12}$

c. $\frac{21}{30}$ $\frac{35}{50}$

d. $\frac{1.8}{7.5}$ $\frac{1.2}{5}$

Name:________________ Date: _____________ Class: ____________

Proportion Notes - KEY

RATIO = **The amt. of one quantity compared the amt. of another quantity.**

RATE = **A ratio with units that are different enough that it can't be written as a fraction.**

UNIT RATE = A rate with a 1 in the denominator.

PROPORTION = Two ratios which are equal to each other.

Proportion Examples

$\frac{2}{5} = \frac{8}{20}$ $\frac{400\ calories}{1\ burger} = \frac{1200\ calories}{3\ burgers}$ $\frac{16}{20} = \frac{44}{55}$

Proportions are almost always written in <u>fraction</u> form.

Checking for Proportions:

You can determine if two ratios form a proportion using two methods:

Method 1 – Simplify Both

$\frac{16}{40} \div \frac{8}{8} = \frac{2}{5}$

$\frac{20}{50} \div \frac{10}{10} = \frac{2}{5}$

So $\frac{16}{40} = \frac{20}{50}$ is a **proportion!**

Method 2 – Cross Products

$\frac{16}{40} = \frac{20}{50}$

40 · 20 ? 50 · 16

800 = 800 ✓

So $\frac{16}{40} = \frac{20}{50}$ is a **proportion!**

Checking for Proportions – Practice Problems:

Determine whether each of the pairs of ratios forms a proportion:

a. $\frac{2}{6} = \frac{8}{24}$

$\frac{2}{6} \div \frac{2}{2} = \frac{1}{3}$

$\frac{8}{24} \div \frac{8}{8} = \frac{1}{3}$

b. $\frac{6}{10} \neq \frac{9}{12}$

$\frac{6}{10} \div \frac{2}{2} = \frac{3}{5}$

$\frac{9}{12} \div \frac{3}{3} = \frac{3}{4}$

c. $\frac{21}{30} = \frac{35}{50}$

$\frac{21}{30} \div \frac{3}{3} = \frac{7}{10}$

$\frac{35}{50} \div \frac{5}{5} = \frac{7}{10}$

d. $\frac{1.8}{7.5} = \frac{1.2}{5}$

1.2 · 7.5 ? 1.8 · 5

9 = 9 ✓

Name:______________ Date: ___________ Class: ___________

Proportion Worksheet

1. Determine whether each pair of ratios forms a proportion. You may simplify both ratios or use the cross-product method. Then insert an "=" or "≠" sign between the pair of ratios.

a. $\frac{4}{12}$ $\frac{5}{15}$

b. $\frac{7}{11}$ $\frac{49}{77}$

c. $\frac{15}{12}$ $\frac{28}{16}$

d. $\frac{10}{25}$ $\frac{25}{75}$

e. $\frac{2}{5}$ $\frac{5}{2}$

f. $\frac{12\ pens}{4\ pencils}$ $\frac{24\ pens}{2\ pencils}$

g. $\frac{21}{28}$ $\frac{26}{39}$

h. $\frac{9\ dogs}{21\ cats}$ $\frac{6\ dogs}{14\ cats}$

Time for some decimal and fraction action!

i. $\frac{2.4}{4}$ $\frac{3}{5}$

j. $\frac{3\frac{1}{3}}{\frac{1}{15}}$ $\frac{3\frac{3}{4}}{\frac{1}{10}}$

k. $\frac{2\frac{1}{2}}{10}$ $\frac{1\frac{1}{4}}{6}$

l. $\frac{\$1.40}{2\ donuts}$ $\frac{\$4.20}{4\ donuts}$

m. $\frac{8.8}{5}$ $\frac{11.88}{6.75}$

n. $\frac{4\frac{4}{9}}{2\frac{2}{3}}$ $\frac{6}{3\frac{3}{5}}$

Name:________________ Date: ____________ Class: ___________

Proportion Worksheet - KEY

1. Determine whether each pair of ratios forms a proportion. You may simplify both ratios or use the cross-product method. Then insert an "=" or "≠" sign between the pair of ratios.

a. $\frac{4}{12} = \frac{5}{15}$

$\frac{4}{12} \div \frac{4}{4} = \frac{1}{3}$

$\frac{5}{15} \div \frac{5}{5} = \frac{1}{3}$

b. $\frac{7}{11} = \frac{49}{77}$

$\frac{7}{11} \div \frac{1}{1} = \frac{7}{11}$

$\frac{49}{77} \div \frac{7}{7} = \frac{7}{11}$

c. $\frac{15}{12} \neq \frac{28}{16}$

$15 \cdot 16 \ ? \ 12 \cdot 28$

$240 \neq 336$

d. $\frac{10}{25} \neq \frac{25}{75}$

$\frac{10}{25} \div \frac{5}{5} = \frac{2}{5}$

$\frac{25}{75} \div \frac{25}{25} = \frac{1}{3}$

e. $\frac{2}{5} \neq \frac{5}{2}$

$5 \cdot 5 \ ? \ 2 \cdot 2$

$25 \neq 4$

f. $\frac{12\ pens}{4\ pencils} \neq \frac{24\ pens}{2\ pencils}$

$\frac{12}{4} \div \frac{4}{4} = \frac{3}{1}$

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

g. $\frac{21}{28} \neq \frac{26}{39}$

$\frac{21}{28} \div \frac{7}{7} = \frac{3}{4}$

$\frac{26}{39} \div \frac{13}{13} = \frac{2}{3}$

h. $\frac{9\ dogs}{21\ cats} = \frac{6\ dogs}{14\ cats}$

$\frac{9}{21} \div \frac{3}{3} = \frac{3}{7}$

$\frac{6}{14} \div \frac{2}{2} = \frac{3}{7}$

Time for some decimal and fraction action!

i. $\frac{2.4}{4} = \frac{3}{5}$

$2.4 \cdot 5 \ ? \ 3 \cdot 4$

$12 = 12$

j. $\frac{3\frac{1}{3}}{\frac{1}{15}} \neq \frac{3\frac{3}{4}}{\frac{1}{10}}$

$\frac{15}{4} \cdot \frac{1}{15} \ ? \ \frac{10}{3} \cdot \frac{1}{10}$

$\frac{1}{4} \neq \frac{1}{3}$

k. $\frac{2\frac{1}{2}}{10} \neq \frac{1\frac{1}{4}}{6}$

$\frac{5}{4} \cdot 10 \ ? \ \frac{5}{2} \cdot 6$

$12\frac{1}{2} \neq 15$

l. $\frac{\$1.40}{2\ donuts} \neq \frac{\$4.20}{4\ donuts}$

$4.2 \cdot 2 \ ? \ 1.4 \cdot 4$

$8.4 \neq 5.6$

m. $\frac{8.8}{5} = \frac{11.88}{6.75}$

$11.88 \cdot 5 \ ? \ 8.8 \cdot 6.75$

$59.4 = 59.4$

n. $\frac{4\frac{4}{9}}{2\frac{2}{3}} = \frac{6}{3\frac{3}{5}}$

$\frac{8}{3} \cdot 6 \ ? \ \frac{40}{9} \cdot \frac{18}{5}$

$16 = 16$

Name:_______________ **Date: ____________** **Class: ___________**

Solving Proportions Warm-up

1. Find the value of x for each problem below:

a. $\frac{5}{3} = \frac{x}{6}$ b. $\frac{2}{12} = \frac{2.5}{x}$ c. $\frac{x}{15} = \frac{8}{20}$

Name:_______________ Date: ____________ Class: ___________

Solving Proportions Warm-up - KEY

1. Find the value of x for each problem below:

a. $\frac{5}{3} = \frac{x}{6}$
x = 10

b. $\frac{2}{12} = \frac{2.5}{x}$
x = 15

c. $\frac{x}{15} = \frac{8}{20}$
x = 6

As on the previous day's warm-up questions, you are not explaining how to do these problems yet, just determining if the students are thinking creatively. You should ***see what solutions the students come up with***, allow for some discussion about how and why they came up with their answers, not give the correct answers yet, go through the Solving Proportion Notes, then come back to the warm-up and use established methods if appropriate and if time allows at that point.

Name:________________ Date: _____________ Class: ____________

Solving Proportion Notes

Proportions can also be used to solve all kinds of problems.

Examples – Solve for x in each proportion below:

Side to Side Method

$$\frac{5}{3} = \frac{x}{6}$$

x =

Up and Down Method

$$\frac{2}{12} = \frac{7}{x}$$

x =

Remember, the arrow always points ___________ the variable!

Cross Product Method

$$\frac{x}{15} = \frac{8}{20}$$

15 · 8 = 20x

Let's do some Algebra!

____ = ____

=

Solving Proportions – Practice Problems:

Solve using side to side method:

a. $\frac{2}{6} = \frac{x}{24}$

b. $\frac{n}{36} = \frac{5}{12}$

c. $\frac{21}{27} = \frac{7}{g}$

Solve using up and down method:

a. $\frac{2}{y} = \frac{3}{12}$

b. $\frac{24}{8} = \frac{m}{12}$

c. $\frac{h}{35} = \frac{3}{15}$

Solve using cross products:

a. $\frac{6}{9} = \frac{10}{x}$

b. $\frac{n}{15} = \frac{8}{10}$

c. $\frac{4}{6} = \frac{6}{g}$

Name:________________ Date: _____________ Class: ____________

Solving Proportion Notes - KEY

Proportions can also be used to solve all kinds of problems.

Examples – Solve for x in each proportion below:

Side to Side Method

• 2

$$\frac{5}{3} = \frac{x}{6}$$

• 2

x = 10

Up and Down Method

$$\bullet 6 \quad \frac{2}{12} = \frac{7}{x} \quad \bullet 6$$

x = 42

Remember, the arrow always points __toward__ the variable!

Cross Product Method

$$\frac{x}{15} = \frac{8}{20}$$

Let's do some Algebra!

$15 \cdot 8 = 20x$

$\frac{120}{20} = \frac{20x}{20}$

$6 = x$

Solving Proportions – Practice Problems:

Solve using side to side method:

a. • 4 $\frac{2}{6} = \frac{x}{24}$ • 4

x = 8

b. • 3 $\frac{n}{36} = \frac{5}{12}$ • 3

n = 15

c. ÷ 3 $\frac{21}{27} = \frac{7}{g}$ ÷ 3

g = 9

Solve using up and down method:

a. • 4 $\frac{2}{y} = \frac{3}{12}$ • 4

y = 8

b. • 3 $\frac{24}{8} = \frac{m}{12}$ • 3

m = 36

c. ÷ 5 $\frac{h}{35} = \frac{3}{15}$ ÷ 5

h = 7

Solve using cross products:

a. $\frac{6}{9} = \frac{10}{x}$

$9 \cdot 10 = 6x$

$\frac{90}{6} = \frac{6x}{6}$

$15 = x$

b. $\frac{n}{15} = \frac{8}{10}$

$8 \cdot 15 = 10n$

$\frac{120}{10} = \frac{10n}{10}$

$12 = n$

c. $\frac{4}{6} = \frac{6}{g}$

$6 \cdot 6 = 4g$

$\frac{36}{4} = \frac{4g}{4}$

$9 = g$

Name:________________ Date: _____________ Class: ____________

Proportion Poetry

A ratio compares,
One thing to another,

$\boxed{\frac{2\ dogs}{3\ cats}}$ ← Ratio

A proportion is two ratios,
Set equal to each other.

Proportion!

 $\boxed{\frac{2}{3} = \frac{4}{6}}$ 

Checking for proportions,
Can be mystifying.

$\frac{2}{3} = \frac{4}{6}$

$3 \cdot 4 = 12$

$2 \cdot 6 = 12$

Proportion!

But you can make them simple,
By just cross-multiplying.

Variables in proportions,
Make you want to solve 'em.
Cause you can use three methods,
To solve each and every problem!

$$\frac{5}{3} \overset{\bullet 2}{=} \frac{x}{6} \quad (\bullet 2)$$

X = 10

$$\bullet 6 \quad \frac{2}{12} = \frac{2.5}{x} \quad \bullet 6$$

X = 15

$$\frac{x}{15} = \frac{8}{20}$$

$$\frac{120}{20} = \frac{20x}{20}$$

6 = x

Let's do some Algebra!

Name:________________ Date: _____________ Class: ____________

Proportion Worksheet (Round 2)

1. Solve for the variable in each of the proportions below (whole numbers):

a. $\frac{7}{5} = \frac{x}{15}$	b. $\frac{4}{9} = \frac{36}{n}$	c. $\frac{y}{7} = \frac{27}{9}$	d. $\frac{4}{z} = \frac{16}{24}$
e. $\frac{4}{d} = \frac{10}{15}$	f. $\frac{8}{g} = \frac{6}{9}$	g. $\frac{b}{15} = \frac{120}{90}$	h. $\frac{18}{24} = \frac{6}{h}$

2. Solve for the variable in each of the proportions (fractions and decimals):

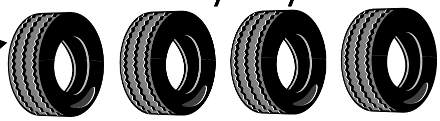
a. $\frac{21}{15} = \frac{x}{5}$	b. $\frac{24}{8} = \frac{27}{n}$	c. $\frac{4}{6} = \frac{x}{15}$	d. $\frac{8.8}{d} = \frac{11}{5}$
e. $\frac{2.25}{d} = \frac{3}{4}$	f. $\frac{6}{g} = \frac{2}{\frac{1}{3}}$	g. $\frac{b}{12} = \frac{25}{60}$	h. $\frac{4\frac{1}{2}}{g} = \frac{1}{\frac{4}{9}}$

Name:_______________ **Date: ____________** **Class: ___________**

Proportion Worksheet (Round 2 - continued)

3. Review of Ratios, Rates, and Proportions

A car company is trying out a new promotion where they give the customer 6 candy canes if they buy a set of four new tires.

Buy these! →  **And get these!** → 

a. What is the RATIO of candy canes to tires (SHOW YOUR WORK to get in simplest form!).

b. Is this ratio also a rate? Why or why not?

____

____

c. Find the UNIT RATE of candy canes per tire. SHOW YOUR WORK!

d. Set up and solve a proportion to determine how many candy canes a customer will get if they buy 48 new tires. Fill in the blanks and solve the proportion.

← **Proportion!**

$\frac{\text{candy canes}}{\text{tires}}$ → $\boxed{\dfrac{\_\_\_\_}{\_\_\_\_} = \dfrac{c}{\_\_\_\_}}$

Name:________________ Date: _____________ Class: ___________

Proportion Worksheet (Round 2) - KEY

1. Solve for the variable in each of the proportions below (whole numbers):

a. $\frac{7}{5} = \frac{x}{15}$ • 3 • 3

x = 21

b. $\frac{4}{9} = \frac{36}{n}$ • 9 • 9

n = 81

c. $\frac{y}{7} = \frac{27}{9}$ • 3 • 3

y = 21

d. $\frac{4}{z} = \frac{16}{24}$ ÷ 4 ÷ 4

z = 6

e. $\frac{4}{d} = \frac{10}{15}$

10d = 4 · 15

$\frac{10d}{10} = \frac{60}{10}$

x = 6

f. $\frac{8}{g} = \frac{6}{9}$

6g = 8 · 9

$\frac{6g}{6} = \frac{72}{6}$

x = 12

g. $\frac{b}{15} = \frac{120}{90}$ ÷ 6 ÷ 6

b = 20

h. $\frac{18}{24} = \frac{6}{h}$ ÷ 3 ÷ 3

h = 8

2. Solve for the variable in each of the proportions (fractions and decimals):

a. $\frac{21}{15} = \frac{x}{5}$ ÷ 3 ÷ 3

x = 7

b. $\frac{24}{8} = \frac{27}{n}$ ÷ 3 ÷ 3

n = 9

c. $\frac{4}{6} = \frac{x}{15}$

6x = 4 · 15

$\frac{6x}{6} = \frac{60}{6}$

x = 10

d. $\frac{8.8}{d} = \frac{11}{5}$

11d = 8.8 · 5

$\frac{11d}{11} = \frac{44}{11}$

d = 4

e. $\frac{2.25}{d} = \frac{3}{4}$

3d = 2.25 · 4

$\frac{3d}{3} = \frac{9}{3}$

d = 3

f. $\frac{6}{g} = \frac{2}{\frac{1}{3}}$

$2g = 6 \cdot \frac{1}{3}$

$\frac{2g}{2} = \frac{2}{2}$

g = 1

g. $\frac{b}{12} = \frac{25}{60}$

12 · 25 = 60b

$\frac{300}{60} = \frac{60b}{60}$

5 = b

h. $\frac{4\frac{1}{2}}{g} = \frac{1}{\frac{4}{9}}$

$1g = \frac{9}{2} \cdot \frac{4}{9}$

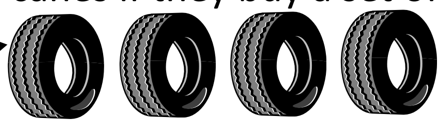
g = 2

Name:________________ Date: _____________ Class: ____________

Proportion Worksheet (Round 2 - continued) - KEY

3. Review of Ratios, Rates, and Proportions

A car company is trying out a new promotion where they give the customer 6 candy canes if they buy a set of four new tires.

Buy these!  **And get these!** 

a. What is the RATIO of candy canes to tires (SHOW YOUR WORK to get in simplest form!).

$$\frac{\text{Candy Canes}}{\text{Tires}} = \frac{6}{4} \div \frac{2}{2} = \frac{3}{2}$$

b. Is this ratio also a rate? Why or why not?

Yes, this ratio is a rate because tires and candy canes cannot be added together to get a "whole" (you can't make it a fraction).

c. Find the UNIT RATE of candy canes per tire. SHOW YOUR WORK!

$$\frac{\text{Candy Canes}}{\text{Tires}} = \frac{3}{2} \div \frac{2}{2} = \frac{1.5\ Candy\ Canes}{1\ Tire}$$

d. Set up and solve a proportion to determine how many candy canes a customer will get if they buy 48 new tires. Fill in the blanks and solve the proportion.

Proportion!

$$\frac{\text{candy canes}}{\text{tires}} \rightarrow \boxed{\frac{3}{2} = \frac{c}{48}}$$

• 24

• 24

c = 72 candy canes (This problem sets the stage for the next section!)

Name:_______________ **Date:** ____________ **Class:** ___________

Proportion Word Problem Warm-up

1. The ratio of boys to girls in Mr. Tolentino's class is 6 to 4. There are 20 girls in the class. How many boys are in the class?

2. Jimmy eats seven cookies every three minutes. How long does it take him to eat 28 cookies?

Name:_______________ Date: ____________ Class: ___________

Proportion Word Problem Warm-up - KEY

1. The ratio of boys to girls in Mr. Tolentino's class is 6 to 4. There are 20 girls in the class. How many boys are in the class?

The answer is 30 boys. As before, this is a warm-up problem, and it is duplicated in the notes. The idea here is to see what the students do, have some discussion on solving word problems with proportions, and then dive into the note taking session to show the students exactly how to do this type of problem using proportions.

2. Jimmy eats seven cookies every three minutes. How long does it take him to eat 28 cookies?

The answer here is 12 minutes. See the note above. Discuss this problem with the students, then move to the notes.

Name:________________ Date: _____________ Class: ____________

Proportion Word Problem Notes

RATIO = ____

RATE = ____

UNIT RATE = ____

PROPORTION = ____

Solving a Word Problem Using Proportions

Proportions can be used to solve a variety of word problems by following three simple steps:

1. Set up a ratio using __________. To get the right answers, you cannot skip this step.
2. Set up the proportion using three ______________ and one ___________. Make sure you match the ___________ and _________ to the _____ in the ratio.
3. ___________ the proportion using any of the __________ methods.
4. Write your answer, ensuring you put appropriate ___________ on it.

Example: The ratio of boys to girls in Mr. Tolentino's class is 6 to 4. There are 20 girls in the class. How many boys are in the class?

Step 1 → ______ → ______ = ______ ← ***Step 2***

Ratio Using Words!

Proportion using numbers and a variable!

Step 3 → ______ → ______ = ______

Step 4 → ______________________________________

Appropriate UNITS on the answer!

Name:_______________ Date: ___________ Class: __________

Proportion Word Problem Notes - KEY

RATIO = **The amt. of one quantity compared the amt. of another quantity.**

RATE = **A ratio with units that are different enough that it can't be written as a fraction.**

UNIT RATE = **A rate with a 1 in the denominator.**

PROPORTION = **Two ratios which are equal to each other.**

Solving a Word Problem Using Proportions

Proportions can be used to solve a variety of word problems by following three simple steps:

1. Set up a ratio using **WORDS**. To get the right answers, you cannot skip this step.
2. Set up the proportion using three **numbers** and one **variable**. Make sure you match the **numbers** and **variable** to the **words** in the ratio.
3. **Solve** the proportion using any of the **three** methods.
4. Write your answer, ensuring you put appropriate **units** on it.

Example: The ratio of boys to girls in Mr. Tolentino's class is 6 to 4. There are 20 girls in the class. How many boys are in the class?

Step 1 → $\boxed{\dfrac{Boys}{Girls}}$ → $\boxed{\dfrac{6}{4} = \dfrac{b}{20}}$ ← *Step 2*

Ratio Using Words!

Proportion using numbers and a variable!

Step 3 → $\dfrac{Boys}{Girls}$ → $\dfrac{6}{4} = \dfrac{b}{20}$

• 5

• 5

Step 4 → **b = 30 boys**

Appropriate UNITS on the answer!

Name:_______________ **Date:** ____________ **Class:** ___________

Proportion Word Problem Worksheet

1. Review of Checking for Proportions

Determine whether each pair of ratios forms a proportion (show all work!). Then insert an "=" or "≠" sign between the pair of ratios.

a. $\frac{4}{28}$ $\frac{8}{56}$	b. $\frac{16}{40}$ $\frac{6}{10}$	c. $\frac{4}{1.6}$ $\frac{5}{2.5}$	d. $\frac{50}{60}$ $\frac{35}{42}$

2. Review of Solving Proportions

Solve for the variable in each of the proportions below:

a. $\frac{7}{9} = \frac{x}{45}$	b. $\frac{6}{18} = \frac{15}{p}$	c. $\frac{h}{5} = \frac{4.4}{11}$	d. $\frac{10}{d} = \frac{4}{26}$

3. Getting Ready for Word Problems

For each word problem below, **set up a ratio using words and a proportion using numbers** (***do not solve the problem***!)

a. Marlene's ratio of phone calls to text messages is 3 to 5. If she makes 27 phone calls, how many texts does she send?

b. The ratio of trucks to cars on a freeway is 5 to 8. If there are 440 cars on the freeway, how many trucks are there?

Name:______________ Date: ___________ Class: __________

Proportion Word Problem Worksheet (continued)

4. Word Problems! Use proportions to solve problems a - f below:

a. "Pablo's Macho Tacos" sells 7 burritos for every 9 tacos sold. If they sell 63 burritos, how many tacos do they sell?

b. The ratio of Aspens to Ponderosa Pines in a part of a forest is 12 to 16 . If there are 12 Ponderosa Pines, how many Aspens are there?

c. 54 pounds of juicy gummy bears costs $450. How many pounds of bears can you get for $50?

d. If the average teenager complains about 13 things every four minutes, how many things will he or she complain about in 24 minutes?

e. The ratio of students with two siblings to students with one sibling is 48 to 33. If there are 11 students with one sibling, how many are there with two siblings?

f. **TRICKY PROBLEM**: The ratio of boys to girls in the sixth grade is 3 to 5. If there are 45 girls, how many STUDENTS are there in the sixth grade?
WARNING: ***This question is harder than it looks! Read it carefully!***

Name:_______________ Date: ____________ Class: ___________

Proportion Word Problem Worksheet - KEY

1. Review of Checking for Proportions

Determine whether each pair of ratios forms a proportion (show all work!). Then insert an "=" or "≠" sign between the pair of ratios.

a. $\frac{4}{28} = \frac{8}{56}$

$\frac{4}{28} \div \frac{4}{4} = \frac{1}{7}$

$\frac{8}{56} \div \frac{8}{8} = \frac{1}{7}$

b. $\frac{16}{40} \neq \frac{6}{10}$

$\frac{16}{40} \div \frac{8}{8} = \frac{2}{5}$

$\frac{6}{10} \div \frac{2}{2} = \frac{3}{5}$

c. $\frac{4}{1.6} \neq \frac{5}{2.5}$

$4 \bullet 2.5 = 10$

$1.6 \bullet 5 = 8$

d. $\frac{50}{60} = \frac{35}{42}$

$50 \bullet 42 = 2100$

$60 \bullet 35 = 2100$

2. Review of Solving Proportions

Solve for the variable in each of the proportions below:

a. $\frac{7}{9} = \frac{x}{45}$ (• 5, • 5)

$x = 35$

b. $\frac{6}{18} = \frac{15}{p}$ (• 3, • 3)

$p = 45$

c. $\frac{h}{5} = \frac{4.4}{11}$

$\frac{11h}{11} = \frac{22}{11}$

$h = 2$

d. $\frac{10}{d} = \frac{4}{26}$

$\frac{4d}{4} = \frac{260}{4}$

$d = 65$

3. Getting Ready for Word Problems

For each word problem below, **set up a ratio using words and a proportion using numbers** (***do not solve the problem***!)

a. Marlene's ratio of phone calls to text messages is 3 to 5. If she makes 27 phone calls, how many texts does she send?

$\frac{\text{phone calls}}{\text{text messages}} \rightarrow \frac{3}{5} = \frac{27}{p}$

b. The ratio of trucks to cars on a freeway is 5 to 8. If there are 440 cars on the freeway, how many trucks are there?

$\frac{\text{trucks}}{\text{cars}} \rightarrow \frac{5}{8} = \frac{t}{440}$

Name:________________ Date: _____________ Class: ____________

Proportion Word Problem Worksheet (continued) - KEY

4. Word Problems! Use proportions to solve problems a - f below:

a. "Pablo's Macho Tacos" sells 7 burritos for every 9 tacos sold. If they sell 63 burritos, how many tacos do they sell?

$$\frac{\text{burritos}}{\text{tacos}} \rightarrow \frac{7}{9} = \frac{63}{t}$$

$\bullet\, 9$ $\bullet\, 9$

t = 81 tacos

b. The ratio of Aspens to Ponderosa Pines in a part of a forest is 12 to 16 . If there are 12 Ponderosa Pines, how many Aspens are there?

$$\frac{\text{Aspens}}{\text{Pines}} \rightarrow \frac{12}{16} = \frac{a}{12}$$

$$\frac{16a}{16} = \frac{144}{16}$$

a = 9 Aspens

c. 54 pounds of juicy gummy bears costs \$450. How many pounds of bears can you get for \$50?

$$\frac{\text{pounds}}{\$} \rightarrow \frac{54}{450} = \frac{p}{50}$$

$\div 9$ $\div 9$

t = 6 pounds

d. If the average teenager complains about 13 things every four minutes, how many things will he or she complain about in 24 minutes?

$$\frac{\text{complaints}}{\text{minutes}} \rightarrow \frac{13}{4} = \frac{c}{24}$$

$\bullet\, 6$ $\bullet\, 6$

t = 78 complaints

e. The ratio of students with two siblings to students with one sibling is 48 to 33. If there are 11 students with one sibling, how many are there with two siblings?

$$\frac{\text{two siblings}}{\text{one sibling}} \rightarrow \frac{48}{33} = \frac{t}{11}$$

$\div 3$ $\div 3$

t = 16 students with two siblings

f. **TRICKY PROBLEM**: The ratio of boys to girls in the sixth grade is 3 to 5. If there are 45 girls, how many STUDENTS are there in the sixth grade?
WARNING: ***This question is harder than it looks! Read it carefully!***

$$\frac{\text{boys}}{\text{girls}} \rightarrow \frac{3}{5} = \frac{b}{45}$$

$\bullet\, 9$ $\bullet\, 9$

b = 27 boys

27 boys
+ 45 girls
72 students

Note: This question leads into the tricky proportion/rate challenge!

Name:_______________ Date: ____________ Class: ___________

The Tricky Proportion / Rate Word Problem Challenge!

Some of these problems are tricky, some are not. This makes the tricky problems even trickier, since you don't know which ones are tricky! Follow the instructions for the problems below. **Show all your work. Don't forget units!** The winners get the thrill of knowing they are ratio/rate/proportion masters!

Use proportions to solve problems 1 - 4 below:

1. One day, Farmer Brown counts his chickens and his eggs. He finds the ratio of chickens to eggs is 7:12. If there are 77 chickens, how many eggs are there?

2. The ratio of laptop computers to desktop computers at a middle school is 8 to 5. If there are 40 desktop computers, how many computers are in the school?

3. The ratio of walnuts to milk chocolate chips in a recipe for chocolate chip brownies is 5 to 8. A particular batch of brownies has 35 walnuts in it. The sum of the number of walnuts, milk chocolate chips, and white chocolate chips in this batch is 123. How many white chocolate chips are there in this batch?

4. If the average tween complains about 13 things every two hours, how many hours will it take to reach 195 complaints?

Name:_______________ Date: ____________ Class: ___________

The Tricky Proportion / Rate Word Problem Challenge!

Use proportions to solve problems 5 - 8 below:

5. The ratio of cups of flour to cups of cooking oil in a cake mix is 3:8. The ratio of cups of cooking oil to cups of water is 6 to 5. There are $\frac{3}{4}$ cups of flour required. How many cups of water are required?

6. If the ratio of students with green shirts to total students in a class is 3 to 8, and are 12 students wearing green shirts, how many are there without green shirts?

7. At Betty's Bouncing Baby Care, the ratio of really dirty diapers to mildly dirty diapers used is 4 to 10. If there were 28 really dirty diapers used on a particular day, how many total diapers were used?

8. Assume the ratio of really dirty diapers to mildly dirty diapers at Betty's remains at 4 to 10. If there are 308 total diapers used in a 3-day period, how many of them are really dirty?

Name:________________ Date: _____________ Class: ____________

The Tricky Proportion / Rate Word Problem Challenge!

Use unit rates to determine which sale is the best deal in problems 9 and 10:

9.

Peaches! 5 for $6

Peaches! 8 for $4

Get your peaches here! $1.18 each

_________________ is the best deal!

10.

Get your gum here! Only $1.32 for a dozen sticks!

_________________ is the best deal!

Use rates to solve problems 11-13 below:

11. You earn $6 for each hour of babysitting. If you babysit for 9 hours, how much money do you earn?

12. A company charges $12 per each 4 feet of fencing they install. How much would it cost for a fence that is 20 yards long?

13. Each 4 square yards of carpet cost $25. How much would it cost for a carpet that is 288 square feet?

Name:_______________ Date: ____________ Class: ___________

The Tricky Proportion / Rate Word Problem Challenge! - KEY

Some of these problems are tricky, some are not. This makes the tricky problems even trickier, since you don't know which ones are tricky! Follow the instructions for the problems below. **Show all your work. Don't forget units!** The winners get the thrill of knowing they are ratio/rate/proportion masters!

Use proportions to solve problems 1 - 4 below:

1. One day, Farmer Brown counts his chickens and his eggs. He finds the ratio of chickens to eggs is 7:12. If there are 77 chickens, how many eggs are there?

$$\frac{chickens}{eggs} \rightarrow \frac{7}{12} = \frac{77}{e}$$

• 11

• 11

t = 132 eggs

2. The ratio of laptop computers to desktop computers at a middle school is 8 to 5. If there are 40 desktop computers, how many computers are in the school?

$$\frac{laptops}{desktops} \rightarrow \frac{8}{5} = \frac{x}{40}$$

• 8

• 8

x = 64 laptops

64 laptops
+ 40 desktops
104 computers

3. The ratio of walnuts to milk chocolate chips in a recipe for chocolate chip brownies is 5 to 8. A particular batch of brownies has 35 walnuts in it. The sum of the number of walnuts, milk chocolate chips, and white chocolate chips in this batch is 123. How many white chocolate chips are there in this batch?

$$\frac{walnuts}{milk\ cc's} \rightarrow \frac{5}{8} = \frac{35}{m}$$

• 7

• 7

m = 56 milk choc chips

walnuts + milk cc's + white cc's = 123
35 + 56 + w = 123
91 + w = 123
- 91   - 91
w = 32

32 white chocolate chips!

4. If the average tween complains about 13 things every two hours, how many hours will it take to reach 195 complaints?

$$\frac{complaints}{hours} \rightarrow \frac{13}{2} = \frac{195}{h}$$

• 15

• 15

h = 30 hours

Name:________________ Date: _____________ Class: ____________

The Tricky Proportion / Rate Word Problem Challenge! KEY

Use proportions to solve problems 5 - 8 below:

5. The ratio of cups of flour to cups of cooking oil in a cake mix is 3:8. The ratio of cups of cooking oil to cups of water is 6 to 5. There are $\frac{3}{4}$ cups of flour required. How many cups of water are required?

$\frac{flour}{oil} \rightarrow \frac{3}{8} = \frac{\frac{3}{4}}{x}$

$\frac{3x}{3} = \frac{6}{3}$

x = 2 cups oil

$\frac{oil}{water} \rightarrow \frac{6}{5} = \frac{2}{w}$

$\frac{6w}{6} = \frac{10}{6}$

$w = 1\frac{4}{6} = 1\frac{2}{3}$

$1\frac{2}{3}$ cups of water

6. If the ratio of students with green shirts to total students in a class is 3 to 8, and are 12 students wearing green shirts, how many are there without green shirts?

$\frac{green\ shirts}{total} \rightarrow \frac{3}{8} = \frac{12}{t}$ (• 4, • 4)

t = 32 total

32 total
\- 12 green
20 students not wearing green

7. At Betty's Bouncing Baby Care, the ratio of really dirty diapers to mildly dirty diapers used is 4 to 10. If there were 28 really dirty diapers used on a particular day, how many total diapers were used?

$\frac{really\ dirty}{mildly\ dirty} \rightarrow \frac{4}{10} = \frac{28}{m}$ (• 7, • 7)

m = 70 mildly

70 mildly
\+ 28 really
108 total diapers

8. Assume the ratio of really dirty diapers to mildly dirty diapers at Betty's remains at 4 to 10. If there are 308 total diapers used in a 3-day period, how many of them are really dirty?

$\frac{really\ dirty}{total\ diapers} \rightarrow \frac{4}{14} = \frac{r}{308}$ (• 22, • 22)

10 + 4

r = 88 really dirty diapers

Name:________________ Date: ____________ Class: ___________

The Tricky Proportion / Rate Word Problem Challenge! KEY

Use unit rates to determine which sale is the best deal in problems 9 and 10:

9.

Peaches!
5 for $6

Peaches!
8 for $4

Get your peaches here!
$1.18 each

Rate: **Unit Rate:**

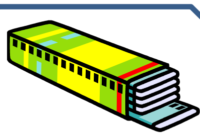
$\frac{\$6}{5 \text{ peaches}} \div \frac{5}{5} = \frac{\$1.20}{1 \text{ peach}}$

$\frac{\$4}{8 \text{ peaches}} \div \frac{8}{8} = \frac{\$0.50}{1 \text{ peach}}$

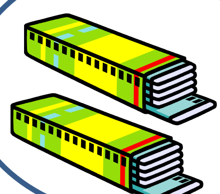
$\frac{\$1.18}{1 \text{ peach}}$

8 peaches for $4 is the best deal!

10.



$0.60



$1.15

Get your gum here! Only $1.32 for a dozen sticks!

$\frac{\$0.6}{5 \text{ sticks}} \div \frac{5}{5} = \frac{\$0.12}{1 \text{ stick}}$

$\frac{\$1.15}{10 \text{ sticks}} \div \frac{10}{10} = \frac{\$0.115}{1 \text{ stick}}$

$\frac{\$1.32}{12 \text{ sticks}} \div \frac{12}{12} = \frac{\$0.11}{1 \text{ stick}}$

$1.32 for a dozen is the best deal!

Use rates to solve problems 11-13 below:

11. You earn $6 for each hour of babysitting. If you babysit for 9 hours, how much money do you earn?

$$\frac{\$6}{1\ \cancel{hour}} \bullet 9\ \cancel{\text{hours}} = \$54$$

12. A company charges $12 per each 4 feet of fencing they install. How much would it cost for a fence that is 20 yards long?

$$\frac{\$12}{4\ \cancel{ft}} \bullet \frac{3\ \cancel{ft}}{1\ \cancel{yd}} \bullet 20\ \cancel{\text{yds}} = \$180$$

13. Each 4 square yards of carpet cost $25. How much would it cost for a carpet that is 288 square feet?

$$\frac{\$25}{4\ \cancel{sq\ yd}} \bullet \frac{1\ \cancel{sq\ yd}}{9\ \cancel{sq\ ft}} \bullet 288\ \cancel{\text{sq ft}} = \$200$$

Name:_______________ Date: ___________ Class: __________

Ratio / Rate / Proportion Unit Assessment

1. Match the word to the appropriate definition

_______ a. Unit Rate	1.	Comparison of one quantity to another. Can be written using a colon, using the word "to", or in fraction form.
_______ b. Proportion	2.	A ratio of two quantities that have different units (a ratio that can't be changed to a fraction).
_______ c. Rate	3.	A ratio of two quantities that have different units, where one of the quantities is equal to one.
_______ d. Ratio	4.	Two ratios set equal to each other.

2. Write each ratio below in THREE DIFFERENT WAYS. *Simplify if possible.*

a. 8 boys, 6 girls ____________ ____________ ____________

b. 4 peas, 11 carrots ____________ ____________ ____________

c. 3 boats, 12 planes ____________ ____________ ____________

3. Use WORDS to give to examples of ratios that can't be changed to fractions

a. _______________ b. ________________

4. There are 12 boys and 18 girls in a science class.

a. Write the ratio of boys to girls (simplify if possible) _______________________

b. Write the ratio of girls to boys (simplify if possible) _______________________

c. Write the ratio of boys to class members (simplify if possible) _______________

d. Write the ratio of girls to class members (simplify if possible) _______________

Name:________________ Date: _____________ Class: ____________

Ratio / Rate / Proportion Unit Assessment (Continued)

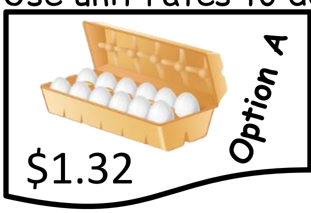
4. Find the unit rate (show all work):

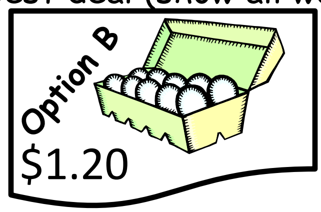
a. \$24 for 4 quarts

b. $\frac{120\ miles}{6\ gallons}$

c. 15 desks : 4 students

5. Use unit rates to determine which is the best deal (show all work).





6. **Determine whether each pair of ratios forms a proportion (show all work!). Then insert an "=" or "≠" sign between the pair of ratios.**

a. $\frac{6}{22}$ $\frac{18}{66}$

b. $\frac{8}{20}$ $\frac{6}{30}$

c. $\frac{6}{1.8}$ $\frac{5}{1.5}$

d. $\frac{70}{80}$ $\frac{35}{45}$

7. Solve each proportion below. SHOW YOUR WORK!

a. $\frac{4}{7} = \frac{16}{x}$

b. $\frac{27}{36} = \frac{y}{4}$

c. $\frac{7}{h} = \frac{56}{80}$

d. $\frac{n}{72} = \frac{4}{9}$

.e. $\frac{8}{24} = \frac{3}{d}$

f. $\frac{2.3}{1.8} = \frac{a}{18}$

g. $\frac{15}{h} = \frac{10}{12}$

h . $\frac{w}{3\frac{1}{3}} = \frac{3}{5}$

Name:_______________ Date: ____________ Class: ___________

Ratio / Rate / Proportion Unit Assessment (Continued)

8. Use proportions to solve the problems below. Remember – WORDS FIRST!

a. The ratio of students who like hockey to students who like baseball is 3 to 8. If 21 students like hockey, use a proportion to determine how many students like baseball.

b. The ratio of a model car to the real car is 2:55. If the real car is 165 inches long from front to back, use a proportion to determine the length of the model car.

c. At Freddy's Ready Teddy Bear store, you can get 6 bears for $20. use a proportion to determine how much it will cost for 9 bears.

d. The ratio of men to women at a track meet is 4:5. If there are 20 men at the meet, use a proportion to determine how many PEOPLE are at the meet.

e. The ratio of walnuts to peanuts in a can of mixed nuts is 3 to 5. There are walnuts, peanuts, and cashews in the mix. The mix has 100 nuts in total. If there are 18 walnuts, use a proportion and additional math to determine how many cashews there are.

Name:_______________ Date: ___________ Class: ___________

Ratio / Rate / Proportion Unit Assessment - KEY

1. Match the word to the appropriate definition

___3___ a. Unit Rate

___4___ b. Proportion

___2___ c. Rate

___1___ d. Ratio

1. Comparison of one quantity to another. Can be written using a colon, using the word "to", or in fraction form.
2. A ratio of two quantities that have different units (a ratio that can't be changed to a fraction).
3. A ratio of two quantities that have different units, where one of the quantities is equal to one.
4. Two ratios set equal to each other.

2. Write each ratio below in THREE DIFFERENT WAYS. *Simplify if possible.*

a. 8 boys, 6 girls $\frac{8}{6} = \frac{4}{3}$ 8:6 or 4:3 8 to 6 or 4 to 3

b. 4 peas, 11 carrots $\frac{4}{11}$ 4: 11 4 to 11

c. 3 boats, 12 planes $\frac{3}{12} = \frac{1}{4}$ 3:12 or 1:4 3 to 12 or 1 to 4

3. Use WORDS to give to examples of ratios that can't be changed to fractions

a. pencils to students ← answers will vary → b. dollars to hours

4. There are 12 boys and 18 girls in a science class.

a. Write the ratio of boys to girls (simplify if possible) $\frac{12}{18} = \frac{2}{3}$

b. Write the ratio of girls to boys (simplify if possible) $\frac{18}{12} = \frac{3}{2}$

c. Write the ratio of boys to class members (simplify if possible) $\frac{12}{30} = \frac{2}{5}$

d. Write the ratio of girls to class members (simplify if possible) $\frac{18}{30} = \frac{3}{5}$

Name:________________ Date: ____________ Class: ___________

Ratio / Rate / Proportion Unit Assessment (Continued) KEY

4. Find the unit rate (show all work):

a. \$24 for 4 quarts

$\frac{\$}{qt} = \frac{24}{4} \div \frac{4}{4} = \frac{\$6}{1\ qt}$

b. $\frac{120\ miles}{6\ gallons}$

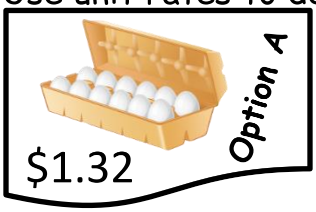
$\frac{mi}{gal} = \frac{120}{6} \div \frac{6}{6} = \frac{20\ mi}{1\ gal}$

c. 15 desks : 4 students

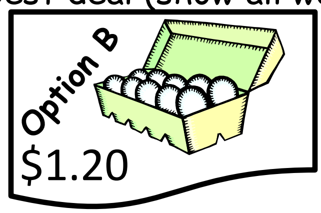
$\frac{desks}{stdnt} = \frac{15}{4} \div \frac{4}{4} = \frac{3\frac{3}{4}\ desks}{1\ stdt}$

3.75 desks per student is okay also!

5. Use unit rates to determine which is the best deal (show all work).



Option A is the best deal!



$\frac{\$}{egg} = \frac{1.32}{12} \div \frac{12}{12} = \frac{\$0.11}{egg}$

$\frac{\$}{egg} = \frac{1.20}{10} \div \frac{10}{10} = \frac{\$0.12}{egg}$

6. **Determine whether each pair of ratios forms a proportion (show all work!). Then insert an "=" or "≠" sign between the pair of ratios.**

a. $\frac{6}{22} = \frac{18}{66}$

$\frac{6}{22} \div \frac{2}{2} = \frac{3}{11}$

$\frac{18}{66} \div \frac{6}{6} = \frac{3}{11}$

b. $\frac{8}{20} \neq \frac{6}{30}$

$\frac{8}{20} \div \frac{4}{4} = \frac{2}{5}$

$\frac{6}{30} \div \frac{6}{6} = \frac{1}{5}$

c. $\frac{6}{1.8} = \frac{5}{1.5}$

6 • 1.5 = 9

1.8 • 5 = 9

d. $\frac{70}{80} \neq \frac{35}{45}$

$\frac{70}{80} \div \frac{10}{10} = \frac{7}{8}$

$\frac{35}{45} \div \frac{5}{5} = \frac{7}{9}$

7. **Solve each proportion below. SHOW YOUR WORK!**

a. $\frac{4}{7} = \frac{16}{x}$

• 4

• 4

x = 28

b. $\frac{27}{36} = \frac{y}{4}$

÷ 9

÷ 9

y = 3

c. $\frac{7}{h} = \frac{56}{80}$

÷ 8

÷ 8

h = 10

d. $\frac{n}{72} = \frac{4}{9}$

• 8

• 8

n = 32

e. $\frac{8}{24} = \frac{3}{d}$

• 3

• 3

d = 9

f. $\frac{2.3}{1.8} = \frac{a}{18}$

$\frac{1.8a}{1.8} = \frac{41.4}{1.8}$

a = 23

g. $\frac{15}{h} = \frac{10}{12}$

$\frac{10h}{10} = \frac{180}{10}$

h = 18

h. $\frac{w}{3\frac{1}{3}} = \frac{3}{5}$

$\frac{5w}{5} = \frac{10}{5}$

w = 2

Name:_______________ Date: ____________ Class: ___________

Ratio / Rate / Proportion Unit Assessment (Continued) KEY

8. Use proportions to solve the problems below. Remember – WORDS FIRST!

a. The ratio of students who like hockey to students who like baseball is 3 to 8. If 21 students like hockey, use a proportion to determine how many students like baseball.

• 7

$$\frac{hockey}{baseball} \rightarrow \frac{3}{8} = \frac{21}{b}$$

• 7

b = 56 students like baseball

b. The ratio of a model car to the real car is 2:55. If the real car is 165 inches long from front to back, use a proportion to determine the length of the model car.

• 3

$$\frac{model}{real} \rightarrow \frac{2}{55} = \frac{m}{165}$$

• 3

m = 6 inches

c. At Freddy's Ready Teddy Bear store, you can get 6 bears for \$20. use a proportion to determine how much it will cost for 9 bears.

$$\frac{bears}{dollars} \rightarrow \frac{6}{20} = \frac{9}{x}$$

$$\frac{6x}{6} = \frac{180}{6}$$

x = \$30

d. The ratio of men to women at a track meet is 4:5. If there are 20 men at the meet, use a proportion to determine how many PEOPLE are at the meet.

• 5

$$\frac{men}{women} \rightarrow \frac{4}{5} = \frac{20}{w}$$

• 5

w = 25 women

25 women
+ 20 men
45 people

e. The ratio of walnuts to peanuts in a can of mixed nuts is 3 to 5. There are walnuts, peanuts, and cashews in the mix. The mix has 100 nuts in total. If there are 18 walnuts, use a proportion and additional math to determine how many cashews there are.

• 6

$$\frac{walnuts}{peanuts} \rightarrow \frac{3}{5} = \frac{18}{p}$$

• 6

p = 30 peanuts

walnuts + peanuts + cashews = 100
18 + 30 + w = 100
48 + w = 100
- 48   - 48
w = 52

52 cashews!