Ratios, Rates & Unit Rates

➢ Ratios

- A _____________________ is a comparison of two quantities by division.

- A ratio can be used to represent relationships <u>within a set (parts to a whole)</u> or <u>between two sets</u>.
    - For instance, we can use a ratio to compare the number of roses in a vase to the number of tulips in the vase. (Between two sets – roses to tulips)
    - Or, we can compare the number of green frogs in a pond to the total number of frogs in the same pond. (Within a set – specific frogs to all frogs)

There are three different ways that we can write ratios.

1. _________________	2. ________________	3. _______________
fraction in simplest form	**using a colon**	**the word "*to*"**

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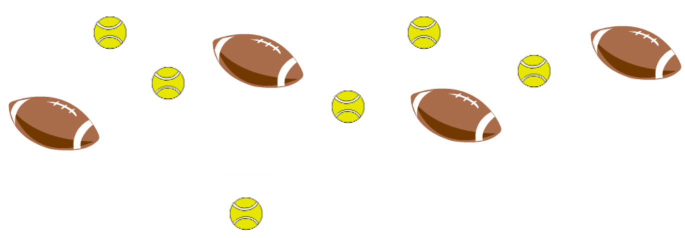
Example 1: Write the ratio that compares the number of footballs to the number of tennis balls.



Example 2: Write the ratio that compares the girls to the total number of students.

Let's Practice… Write each ratio three different ways. <u>Don't forget to simplify each ratio.</u>

1. The number of dogs to the number of cats.

2. 4 roses out of 24 flowers

3. 12 circles to 8 squares

You Practice…

Write each ratio as a fraction in <u>simplest form</u>, using a colon, and using the word "to".

1) 3 sailboats to 6 motorboats

2) 4 tulips to 9 daffodils

3) 5 baseballs to 25 softballs

4) 2 days out of 8 days

5) 6 poodles out of 18 dogs

6) 10 yellow eggs out of 12 colored eggs

7) 12 sheets of paper out of 28

8) 18 hours out of 24 hours

9) 16 elms out of 20 trees

10) 15 trumpets to 9 trombones

11) 5 ducks to 30 geese

12) 14 lions to 10 tigers

13) 6 sodas out of 16 drinks

14) 20 blue jays out of 35 birds

Write the ratio "21 wins to 9 losses" as a fraction in simplest form.

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- Two ratios that have the same value are **equivalent ratios.**

Determine whether the ratios are equivalent.

$\frac{3}{4}$ and $\frac{12}{16}$ $\qquad$ $\frac{25}{35}$ and $\frac{10}{14}$ $\qquad$ $\frac{12}{17}$ and $\frac{10}{15}$

➢ Rates & Unit Rates

A __________ is a ratio that compares two quantities with different kinds of units.

Example: $\frac{100\ words}{2\ minutes}$

When a rate is simplified so that it has a _________________________, it is called a **UNIT RATE.**

To find a unit rate:

1. Write two quantities as a ___________________.

2. _____________ both the numerator and the denominator by the denominator.

3. This will create a denominator of ______ (a single unit means 1)

4. Write unique units of measurement for both.

Example: $\frac{100\ words}{2\ minutes} = \frac{\div 2}{\div 2} = \frac{(\quad)words}{1\ minute}$ or " _____ words per minute"

1) Alex can run 24 miles in 3 hours. What is his average speed in miles per hour?

2) You buy 5 pounds for $35. How much does one pound cost?

3) The costs of different sizes of orange juice are shown in the table.

Which container costs the least per ounce?

Amount	Total Cost	Rate	Cost per ounce (Unit cost)
16 oz	$1.28		
32 oz	$1.92		
64 oz	$2.56		
96 oz	$3.36		

Bargain Hunting Activity

For each exercise below, rates are given in Column A and Column B. Figure out the best buy.

Column A	Unit Rate A	Column B	Unit Rate B	Best Buy (A or B?)
1 apple for $0.19		3 apples for $0.59		
20 pounds of pet food for $14.99		50 pounds of pet food for $37.99		
A car that travels 308 miles on 11 gallons of gasoline		A car that travels 406 miles on 14 gallons of gasoline		
10 pens for $8.99		25 pens for $19.75		
1-gallon can of paint for $13.99		5-gallon bucket of paint for $67.45		
84 ounces of liquid detergent for $10.64		48 ounces of liquid detergent for $6.19		
5,000 square feet of lawn food for $11.99		12,500 square feet of lawn food for $29.99		
2 compact discs for $26.50		3 compact discs for $40.00		
8 pencils for $0.99		12 pencils for $1.49		
1,000 sheets of computer paper for $8.95		5,000 sheets of computer paper for $41.99		