**All About Ratios**

 Ratios are used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and to find

the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between two\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; such as measurements of lengths, weight, time, cost, and etc.

**Ratios can be written in 3 forms:**

  

 Picture it! **In your string bag you have 5 pens and 12 pencils.**

What are you comparing?

What is the ratio of pencils to pens?

Does order matter? Why?

What is the difference between the ratios 5:12 and 5:17 when comparing pens to pencils?

 **Pair Share**

How many ways could you compare the students in our class? List 3:

1.

2.

3.

**Part to Part** or **Part to Whole**

**Ratios**



**With an assigned partner**

Using the ice cream cones above identify three ratios that compare part to part.

 1.

2.

3.

Using the ice cream cones above identify two ratios that compare part to whole.

1.

2.

**Simplifying Ratios**

To simplify a ratio, first write the ratio in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and then simplify both the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a common factor.

**Simplest form:** When the greatest common factor (GCF) of the numerator and the denominator equals 1. Use the process of upside-down division to compute simplest form. (Order matters).

12:16

15 to 45

30/60

**72**

**96**

**Example:** At RSMS, there are 295 students in the sixth grade and 15 sixth grade teachers. Write the ratio of teachers to students in simplest form.

Write the ratio of teachers to students in three ways using the simplest form.

**Comparing Ratios**

**Finding Common Denominators**

To compare ratios: Rewrite them as fractions with \_\_\_\_\_\_\_\_\_\_\_\_\_ denominators. Ratios are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when the numerator and denominator \_\_\_\_\_\_\_\_\_\_ each other.

**Remember** to use a common multiple or factor with both the numerator and denominator to create an equivalent ratio.

Are the following ratios equivalent to each other?

$\frac{3}{4}$ **=** $\frac{6}{8}$Yes or No

$ \frac{7}{9}$ **=** $\frac{9}{11}$Yes or No

$\frac{5}{10}$ **=** $\frac{6}{12}$Yes or No

$\frac{7}{14}$ **=** $\frac{10}{70}$Yes or No

 **Pair Share**

Can you prove if ratios are equivalent with a picture? \_\_\_\_\_\_\_

If so, draw an example:

**Finding Equivalent Ratios**

**\*Strategies** to use to help find ratios that are equivalent.

 **\*Tables:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ratio | X2 | X3 | X4 | X5 | X6 |
| 3 | 6 | 9 | 12 | 15 | 18 |
| 5 | 10 | 15 | 20 | 25 | 30 |

Complete the table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ratio | X2 | X3 | X4 | X5 | X6 |
|  | 4 |  | 8 |  |  |
|  | 6 |  | 12 |  |  |

When does a table show a unit rate?

 **Pair Share**

**Create a table** that show equivalent ratios including a unit rate that you could use to answer how much 10 roses would cost if 3 roses cost $2.00?

****

**Modeling Ratios**

Draw 3 different models and a table for the following word problems:

1. You have a ratio of 3 red marbles to 4 blue marbles in a bag. What are 3 possible combinations of marbles can you have?

|  |  |  |  |  |  |  |  |
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1. You have a ratio of 4 erasers to 12 pencils. What are 3 possible combinations of erasers and pencils can you have?

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**2 More Strategies**

Strategies to use to help find ratios that are equivalent:

**\*Double Number Line:**

 **1 2 3 4 5 6 7**

 **2 4 6 8 10 12 14**

Complete the double number line

 **1 3 6 15**

 **14 21 28**

 **\*Tape Diagram:**

 Apple Juice

|  |  |  |
| --- | --- | --- |
|  |  |  |

 Grape Juice

|  |  |
| --- | --- |
|  |  |

 **Pair Share**

This diagram can represent a mixture of apple juice to grape juice with a 3 to 2 ratio. If the diagram represented 5 cups of juice, each section would equal 1 cup. If the diagram represented 30 cups, what would each section equal?

**Modeling Ratios on a Coordinate Plane**

Cindi collects 12 new baseball cards each year. Use equivalent ratios to graph the growth of her baseball card collection over time.

Step 1 Write an ordered pair for the first year.

 Let the *x*-coordinate represent the number of years:\_\_\_

 Let the *y*-coordinate represent number of coins:\_\_\_\_\_

Step 2 Make a table of equivalent ratios.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Cards (x) |  |  |  |  |  |
| Year (y) |  |  |  |  |  |

Step 3 Write ordered pairs for values in the ratio table:



|  |
| --- |
|  |

Step 4 Give the graph a title; label the two axis.

Step 5 Graph the ordered pairs as points.

1. What does point (3, 36) represent on the graph?
2. The point (1, 12) represents the year Cindi started her collection. It shows that she had 12 baseball cards after one year. Using the graph, how many baseball cards will she have after 8 years?

**Writing Proportions**

Proportions are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of two equal ratios. Therefore, equivalent relationships are relationships between

two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ratios.

 **W K U**

 **Word Form Known Ratio Unknown Ratio**

 Two units being Ratio using numbers Ratio using number

 compared and a variable

Mrs. Wade looked in her closet and saw 10 black shirts and 6 green shirts. If Ms. Toland has 20 black shirts, how many green shirts would she have if they have equal ratios?

 **Word Form** **Known Ratio** **Unknown Ratio**

 Black to Green 10 to 6 20 to *x*

How to set up the equivalent relationship:

$ \frac{}{}=\frac{}{}$

What does *x* equal?

**Try it again:**

Oranges are sold in a bag of 5 for $2. The ratio of oranges to their cost is 5:2. If I bought 20 oranges, you could set up a proportion to determine the cost.

$ \frac{}{}=\frac{}{}$

You can solve this by figuring out how many bags of 5 you need to have 20 oranges. You would need 4 bags of 5 oranges to equal 20. Therefore, you would multiply $2 times 4 to get $8.

What does *x* equal? \_\_\_\_\_\_\_\_\_ Did your partner get the same solution?

**Solving Proportions**

Kennedy practices her new cheer routine for 4 hours over the course of three days. If she continues at this rate, how long will she practice in one week?

|  |  |
| --- | --- |
| **Identify**What are you being asked to solve? |  |
| **Construction using W K U** |  |
| **Write**Strategies needed to solve the problem. |  |
| **Solve**Show math and label the answer that solves the problem. |  |

**Rates and Unit Rates**

A **rate** is a special ratio in which the two terms are in different units. For example, if a 12-ounce can of corn costs 69¢, the **rate** is 69¢ for 12 ounces.

A **unit rate** is the ratio of two measurements in which the second term is 1.

Picture it! What do you think one ounce of the corn would cost? These would be the **unit rate** or also called the unit price or cost.

****

**What do you mean by "unit price?"**
Unit price is the cost of one of a particular item. You can compare unit prices to help determine which item is a better buy. For example, if at one store 4 pounds of apples cost $3.84 and at another store apples cost $5.52 for 6 pounds which store has the better price for apples?



**$5.52**

**Per**

**6 lbs.**

**$ 3.84**

**Per**

**4 lbs.**

 **Pair Share**

Which apple advertises the better deal?

Write how you decided which was the better buy?

 **NOTES**



**What is the ratio of your Pattern?**

Using only **2** colors, color in the grid to represent

a repeating pattern of a tiled floor. (all blank squares count as white)

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 What is the ratio by color? (The “W”)

 What is the ratio of the two colors? (The “K”)

 What is the ratio in simplest form? (The “U”)

**Converting between fractions, percents, and decimals**

 **F**

 **÷** $\frac{\%}{100}$

 **D**  **x 100** **P**

**Pair share**

What is the percent of each color on your tile floor?

Show your work:

Write each percent of your tiles as a decimal.

Show your work:

**Equivalent Relationships**

**Multistep Ratios and Percent Problems**

How Long Until I Can Buy A Car?

You just got hired on to sell furniture at Wilson Bates. Your starting salary is $200 a week with 13% commission on every sale that you make. Fill out the table below to figure your total earnings for your first 2 months of work.

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Worked** | **Salary** | **Amount Sold** | **Commission** |
| **January** |  |  |  |
| Week 1 |  | $300 |  |
| Week 2 |  | $600 |  |
| Week 3 |  | $625 |  |
| Week 4 |  | $400 |  |
| **February**  |  |  |  |
| Week 5 |  | $325 |  |
| Week 6 |  | $600 |  |
| Week 7 |  | $250 |  |
| Week 8 |  | $700 |  |
| Total:  |  Total: |

You are trying to save money to buy a car so you deposit 60% of each month’s pay check into your savings account. Also, each month you earn 2% interest on the balance of your savings account. Complete the table below to figure the balance of your account.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Description** | **Deposit** | **Debt** | **Balance** |
| Jan | 60% of pay check |  |  |  |
| Jan | Interest Earned |  |  |  |
| Feb |  |  |  |  |
| Feb |  |  |  |  |
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The car you have your eye on is a used Honda on sale for $12,000. If your parents agreed to help you buy the car and they agreed to pay 30% of the cost, estimate how many months would it take you to save enough money to make the purchase?

**Ratio and Equivalent Reasoning**

**Unit Final Readiness**

**Math 6**

**“I Can Statements”**

I Can Use Ratios and Equivalent Relationships to Help Me Do Math.

* I can use ratios to describe a ratio relationship between two quantities. 6.RP.1
* I understand how to identify ratios to find a unit rate. 6.RP.2
* I can use ratios and rates reasoning to solve real-worlds and mathematical problems. 6.RP.3
	+ I can make and use tables to compare equivalent ratios. . 6.RP.3 a
	+ I can solve rate problems involving unit pricing and constant speed. . 6.RP.3 b
	+ I can find a percent of a quantity as a rate per 100. . 6.RP.3 c
	+ I can use ratio reasoning to convert measurement units –multiplying and dividing. 6.RP.3 d

**Math 6A**

**“I Can Statements”**

* I can use a table or graph to identify a unit rate. 7.RP.2.b
* I can compute unit rates associated with ratios of fractions. 7.RP.1
* I can use equivalent relationships to solve multistep ration and percent problems. 7.RP.3

**Vocabulary**

|  |  |
| --- | --- |
| **Ratio*** Part
* Whole
 | A **ratio** is the relation between two quantities expressed as the quotient of one divided by the other. A relationship between two quantities, normally expressed as the quotient of one divided by the other. |
| Write in your own words and give an example or picture of your understanding. |
| **Unit Rate** | The **unit rate** describes the number of **units** in the first quantity to one **unit** of the second quantity. |
| Write in your own words and give an example or picture of your understanding. |
| **Equivalent** | **Equivalent** is something that is essentially the same or equal to something else. |
| Write in your own words and give an example or picture of your understanding. |
| **Double Number Line** | A **double number** line is a number line with a scale on top and a different scale on the bottom so that you can organize and compareitems that change regularly according to a rule or pattern. |
| Write in your own words and give an example or picture of your understanding. |
| **Tape Diagram** | **Tape diagram is a** drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model. |
| Write in your own words and give an example or picture of your understanding. |
| **Vocabulary Continued** |
| **Proportions** | **Proportions** are the comparison of two equal ratios. Therefore, equivalent relationships are relationships between two equal ratios. |
| Write in your own words and give an example or picture of your understanding. |
| **Percent** | A **percent** is the number of parts out of 100 of something. |
| Write in your own words and give an example or picture of your understanding.  |
| **Simplest Form** | **Simplest form** is a fraction in which the numerator and denominator have no common factor except 1.  Fractions can be simplified when the numerator and denominator have a common factor in them. |
| Write in your own words and give an example or picture of your understanding. |
| **GCF****Greatest Common Factor** | The **greatest common factor** (**GCF**) is the largest factor (divisible by) of two numbers. |
| Write in your own words and give an example or picture of your understanding. |
| **Vocabulary Continued** |
| **Constant Speed** | Movement at a fixed or the same (constant) distance per unit of time. |
| Write in your own words and give an example or picture of your understanding. |
| **Percents above 100** | A percent that is greater than 100% is a quantity which is greater than 100 out of 100 or, in other words greater than 1.110%  225%  671% |
| Write in your own words and give an example or picture of your understanding. |
| **Percents below 1** | Because "percent" means "out of, or per 100", a percent which is less than 1% is a quantity which is less than 1 out of 100..068%  .02%  .119% |
| Write in your own words and give an example or picture of your understanding. |
| **Coordinate Plane** | The coordinate plane is a two-dimensional surface on which we can plot points, lines and curves. It has two scales, called the *x*-axis and *y*-axis, at right angles to each other. |
| Write in your own words and give an example or picture of your understanding. |
| **Vocabulary Continued** |
| **Origin** | The starting point. On a number line it is 0. On a two-dimensional graph it is where the X axis and Y axis cross, marked (0,0) on the graph. |
| Write in your own words and give an example or picture of your understanding. |

**Super site** to understand math vocabulary and concepts:

http://www.amathsdictionaryforkids.com/dictionary.html