



# MATH NEWS



LAFAYETTE  
PARISH SCHOOL SYSTEM

Grade 6, Module 1, Topic B

## 6<sup>th</sup> Grade Math

*Module 1: Ratios and Unit Rates*

### Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Module 1 of Eureka Math (Engage New York) introduces the concepts of ratio and rate to 6<sup>th</sup> graders. Their previous experience solving problems involving multiplicative comparison serves as the conceptual foundation for understanding ratios as a multiplicative comparison of two or more numbers used in quantities or measurement.



### Focus Area Topic B:

#### *Collections of Equivalent Ratios*

#### Words to Know:

**Ratio** - A pair of nonnegative numbers, A:B, where both are not zero, and that are used to indicate that there is a relationship between two quantities such that when there are A units of one quantity, there are B units of the second quantity.

**Equivalent Ratios** - Ratios that have the same value.

**Associated Ratios** (e.g., if a popular shade of purple is made by mixing 2 cups of blue paint for every 3 cups of red paint, not only can we say that the ratio of blue paint to red paint in the mixture is 2:3, but we can discuss associated ratios such as the ratio of cups of red paint to cups of blue paint, the ratio of cups of blue paint to total cups of purple paint, the ratio of cups of red paint to total cups of purple paint, etc.)

**Value of a Ratio**- For the ratio A:B, the value of the ratio is the quotient A/B.

**Ratio Table** A table listing pairs of numbers that form equivalent ratios.

### Focus Area Topic B:

#### *Collections of Equivalent Ratios*

Students can use repeated addition or multiplication to create a ratio table.

orange	blue
2	6
4	12
6	18
8	24

All ratios are equivalent to each other.

Students are to demonstrate understanding of the additive and multiplicative properties of ratio tables. If **adding** a certain number to each entry in one column, you may not be able to add that same number to the entries in the other column and keep the same ratio. For example, in the ratio table above, 2 is being added down the column labeled “Orange”. If we added 2 down the column labeled “Blue”, we would not get the same entries as the table. Instead, the numbers you add to the entries must be related to the ratio used to make the table.

However, if **multiplying** the entries in one column by a certain number, you can multiply the entries in the other column by the same number, and the ratio remains.

orange	blue
2	6
4	12
6	18
8	24

*Note: In the original image, blue curved arrows on the left and right sides of the table indicate that both columns are multiplied by 4 (x4).*

Ratio tables can be used to compare two ratios. You can do this by extending the table or comparing the values of the ratios.



## Focus Area Topic B:

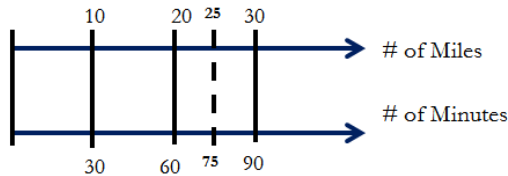
### Collections of Equivalent Ratios



Students will build on their experience with number lines by representing collections of equivalent ratios on a double number line.

#### Example Problem and Solution

Julie has been biking at a constant speed for 30 minutes during which time she traveled 10 miles. Julie would like to know how long it will take her to run 25 miles, assuming she maintains the same constant speed. Help Julie determine how long the trip will take. Include a table or diagram to support your answer.

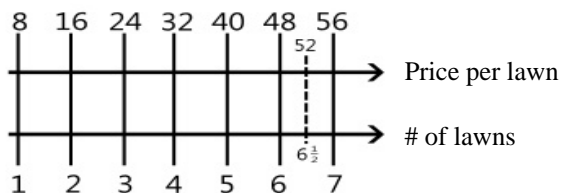


Create a double number line using the increments 10 miles and 30 minutes. 25 miles falls half way in between 20 and 30 miles so its equivalent minutes would be half way between 60 and 90 minutes, which is 75 minutes.

It will take Julie 75 minutes to travel 25 miles.

#### Example Problem and Solution

Paul wants to buy a new bike. The bike costs 52 more dollars than he has. If Paul charges \$8 to cut grass, how many lawns will he have to cut to have enough money to buy his bike? Use a double number line to support your answer



Create a double number line using the increments 1 lawn and \$8/lawn. \$52 falls half way in between \$48 and \$56 so its equivalent lawns would be half way between 6 and 7 lawns, which is 6 1/2.

Paul would need to cut 6 1/2 lawns.

## Focus Area Topic B:

### Collections of Equivalent Ratios

Students will relate their knowledge of ratio tables to equations using the value of the ratio.

#### Example Problem and Solution

The ratio of boys to girls in Mrs. Smith's math class is 1:3. Use the ratio table to create two equations that would show the relationship between the number of boys and the number of girls in the class.

Boys (B)	Girls (G)
1	3
2	6
3	9
4	12
5	15

There are three times as many girls in the class than boys. The equation to determine the number of girls in Mrs. Smith's would be:

$$G = 3B$$

There are 1/3 the number of boys in the class than girls. The equation to determine the number of boys in Mrs. Smith's class would be:

$$B = \frac{1}{3}G$$

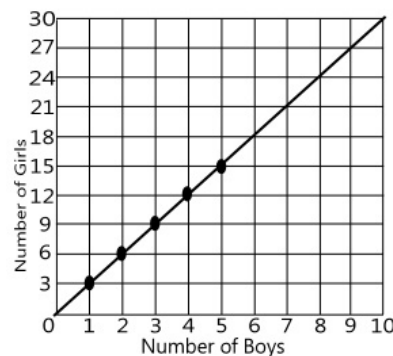
If there were 8 boys in the class, how many girls are there? Use the equation to find your answer.

Since you know the number of boys, you would use the formula  $G = 3B$  to find the answer.  $3 \times 8 \text{ boys} = 24 \text{ girls}$ . **There are 24 girls in the class.**

\*\*A ratio table, equation, or double number line diagram can be used to create ordered pairs. These ordered pairs can then be graphed on a coordinate plane as a representation of the ratio.

#### Example Problem and Solution

Using the ratio table from the previous example, graph the ordered pairs on the coordinate plane.



Each entry on the ratio table creates an ordered pair that can be graphed on a coordinate plane. Ex: 1 boy to 3 girls creates the ordered pair (1, 3) 2:6 creates (2, 6)...

What would be the number of boys if there were 24 girls in the class?

To find the number of boys, find the y coordinate that matches up with 24 girls on the line.

There are 8 boys in the class.

