Name: _____ Date: _____

We did these together, I did not give a video link

As we saw in the last lesson, ratios can be thought of as **fractions**.

Exercise #1: For dinner, there are 10 slices of pizza for 4 kids.

(a) Express the ratio of slices to kids. Write this ratio as a number in four different ways:

Unreduced fraction: $\dfrac{10}{4}$ Mixed number: $2\frac{1}{2}$

Reduced fraction: $\dfrac{5}{2}$ Decimal: 2.5

(b) Using appropriate **units** explain what the number you found in (a) represents.

Each kid gets 2.5 slices of pizza.

(c) If there were 10 kids and the ratio of pizza slices to kids stayed the same, how many slices would be needed? Justify.

25 slices

$$\frac{10}{4} = \frac{}{10}$$

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

The value we found in (a), especially when expressed in mixed number or decimal form, is known as a **unit rate** because it tells us how much how much pizza **one kid** receives. Unit rates can always be found from ratios by simply dividing.

$$\frac{a}{b} = \frac{\square}{1}$$

UNIT RATES

When we have the ratio of **a to b**, the **unit rate** can be found using the division $a \div b$ or $\dfrac{a}{b}$ and will have the units of **a "per" one unit of b**.

How much for ONE

Exercise #2: For each of the following scenarios, a ratio has been indirectly given. Specify the **unit rate** associated with this ratio. Use proper units.

(a) In a cage that only has spiders, the ratio of legs to spiders is 56 to 7.

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

8 legs per spider

(b) At a snack stand, Melanie paid $6.75 for 3 pretzels.

$$\frac{6.75}{3}$$

$$3\overline{)6.75}$$
$$\begin{array}{r} 2.25 \\ -6\ \downarrow \\ \hline 07 \\ -6 \\ \hline 15 \\ -15 \\ \hline 0 \end{array}$$

$2.25 per pretzel

Unit rates can certainly involve fractions, which can be confusing especially if the fractions are less than 1.

Exercise #3: For each of the following problems, give a unit rate based on the ratio of the first quantity to the second and use appropriate units.

(a) A recipe calls for 2 cups of salt for every 8 cups of water.

$$\frac{2}{8}$$

$$\begin{array}{r} .25 \\ 8\overline{)2.00} \\ -16\downarrow \\ \hline 40 \\ -40 \\ \hline \end{array}$$

.25 cups of salt per cup of water.

(b) A tree is growing 3 feet every 5 years.

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

$$\begin{array}{r} .6 \\ 5\overline{)3.0} \end{array}$$

.6 feet per year

Unit rates are very much linked to division in the sense that we are always trying to figure out how much of one quantity we have given a **single unit** of another quantity. A special case of this involves how fast (or slow) an object is traveling.

Exercise #4: A car is traveling such that the ratio of the distance it travels, in miles, to the time it has been traveling, in hours, is 124 miles to 2 hours.

(a) Convert this ratio into a unit rate. Use appropriate units in your answer.

$$\frac{124 \text{ miles}}{2 \text{ hours}} = \frac{62}{1 \text{ hour}}$$

(b) If the car travels for three hours at this rate, what is the distance it will travel in miles?

$$\begin{array}{r} 62 \\ \times3 \\ \hline 186 \end{array}$$ miles in 3 hours

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SPEED

The ratio of distance traveled to time spent traveling is known as **speed**: $\text{speed} = \dfrac{\text{distance}}{\text{time}}$

Exercise #5: A slow moving bug is traveling such that the distance it has moved is shown in the graph to the right. What is its speed? Express your answer using decimals and proper units.

$$\frac{13}{4} = \frac{\square}{1}$$

$$\begin{array}{r} 3.25 \\ 4\overline{)13.00} \\ -12 \\ \hline 10 \\ -8 \\ \hline 20 \\ -20 \\ \hline 0 \end{array}$$
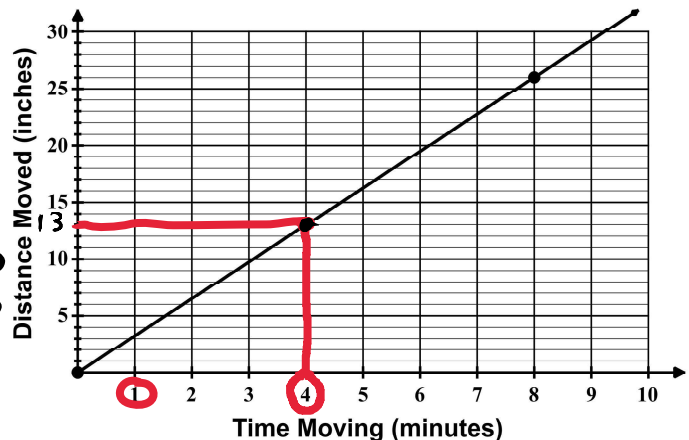
3.25 inches per minute

Distance Moved (inches) vs Time Moving (minutes)

Name: _____ Date: _____

RATIOS AND UNIT RATES
N-GEN MATH® 6 HOMEWORK

USING YOUR MATH

1. For each of the following, determine a unit rate using the information given. Show the division that leads to your answer. Use appropriate units. All rates will be whole numbers.

   (a) At a theatre, Mia paid $35 for five tickets.

   (b) A local animal shelter has 21 cats and 7 dogs.

   (c) In a race, Mateo runs 40 feet in 4 seconds.

   (d) Ju was measuring out liquid and found that 48 cups of water filled up 3 gallons.

2. For each of the following, determine a unit rate using the information given. Show the division that leads to your answer. Use appropriate units. Express your rates in decimal form.

   (a) A recipe calls for 18 grams of salt per 4 cups of water.

   (b) A baby gained 19.2 ounces over the span of 6 weeks.

   (c) A piece of gold has a weight to volume ratio of 76.8 grams to 4 cubic centimeters.

   (d) A person filled up a car with $23.03 worth of gas and put in 7 gallons.

3. For each of the following, determine a unit rate using the information given. Leave each as a fraction in simplest form. Convert any improper fractions into mixed numbers. Use appropriate units in your answer.

(a) A baker has determined that for every 4 pounds of flour, she can make 6 loaves of bread.

(b) Jamie lines up dominoes. He finds that in 10 inches he can line up exactly 8 dominoes.

4. In a race, Kendyll ran 60 feet in 5 seconds. If the ratio of the distance she runs to the time she runs stays the same (stays constant), answer the following questions:

(a) Determine Kendyll's speed. In other words, determine the ratio of the distance she travels divided by the time she travels. Use appropriate units.

(b) Based on your answer to (a), fill in the table below for the distance Kendyll runs for a variety of times.

Time (seconds)	0	1	2	3	4	5
Distance (feet)	0					60
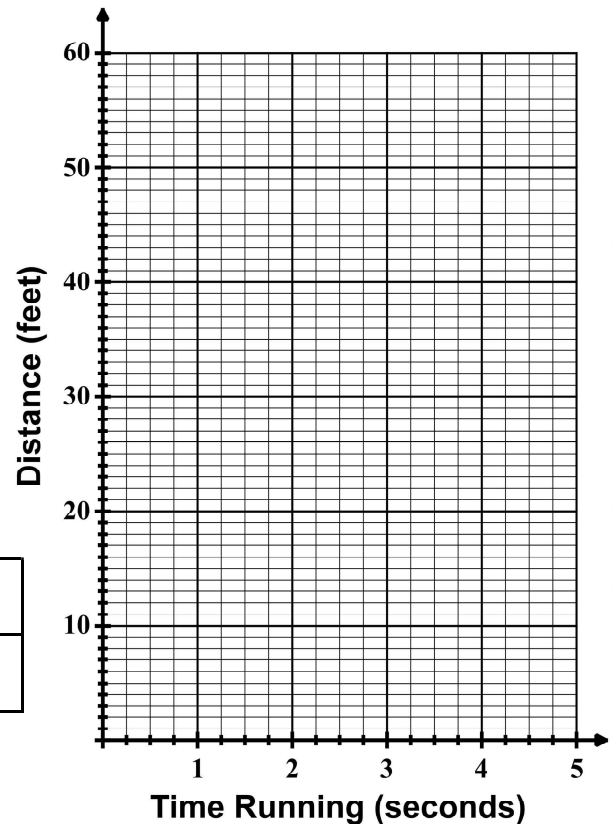
(c) Plot the values from your table on the grid to the right and connect with a straight line.

Distance (feet) vs. Time Running (seconds)

(d) If Kendyll continued to run at this speed for 9 seconds, what is the total distance she would run? Show how you arrived at your answer.