Take out the two homework pages from last class.
Make sure you put your name on them :)

INTRODUCTION TO RATIOS

GUIDED NOTES

IMPORTANT VOCABULARY:

- **Ratios:** A Comparison of two quantities

INTRODUCTION TO RATIOS

1. Ratios can be part-to-part, parts-to-whole or whole-to-part comparisons.
2. There are three ways to write ratios: fraction, "to" and colon :
3. The ratio of a to b can be written as: $\frac{a}{b}$, a to b, $a:b$

GUIDED PRACTICE

In class, there are 12 girls and 11 boys. Write each ratio 3 ways.

- Girls to boys
  $\frac{12}{11}$ 12 to 11 12:11
- Boys to girls
  $\frac{11}{12}$ 11 to 12 11:12

Suppose you are at camp. There are 5 counselors and 13 campers in every cabin. Write each ratio 3 ways.

TOTAL 18

- Counselors to campers
  $\frac{5}{13}$ 5 to 13 5:13
- Campers to total people in the cabin $\frac{13}{18}$ 13 to 18 13:18

There are three times as many cashews as almonds in the mixture of nuts. Write each ratio 3 ways.

- Cashews to almonds
  $\frac{3}{1}$ 3 to 1 3:1
- Almonds to cashews
  $\frac{1}{3}$ 1 to 3 1:3

Write a ratio in three ways for each statement:

- There are 125 students for every 5 teachers
  $\frac{125}{5}$ 125 to 5 125:5
- Combine 1 part ginger ale to 4 parts fruit punch
  $\frac{1}{4}$ 1 to 4 1:4

Name:_____ Date:_____

INTRODUCTION TO RATIOS

PRACTICE PROBLEMS

Write each ratio 3 ways

#1 There are 5 cats for every 4 dogs at the animal shelter. What is the ratio of dogs to cats?

$\frac{4}{5}$ 4 to 5 4:5

#2 In band, there are 3 woodwinds for every 1 percussion player. What is the ratio of woodwinds to percussion players?

$\frac{3}{1}$ 3 to 1 3:1

#3 In Kelsey's pencil case, she has 2 highlighters for every 7 pencils. What is the ratio of pencils to highlighters?

$\frac{7}{2}$ 7 to 2 7:2

#4 In the bag, there are 19 green marbles for every 11 blue marbles. What is the ratio of green marbles to total (30) marbles?

19 + 11 = 30

$\frac{19}{30}$ 19 to 30 19:30

#5 At the aquarium, there are 200 fish for every 1 shark. What is the ratio of sharks to fish?

$\frac{1}{200}$ 1 to 200 1:200

#6 The recipe calls for 2 cups of flour for every cup of sugar. What is the ratio of sugar to flour?

$\frac{1}{2}$ 1 to 2 1:2

#7 Each supply bin has 4 bottles of glue and 3 pairs of scissors. What is the ratio of total supplies to bottles of glue?

3 + 4 = 7

$\frac{7}{4}$ 7 to 4 7:4

#8 Last year Anna read 20 books. 5 were non-fiction, 7 were graphic novels and 8 were mystery novels. What is the ratio of graphic novels to total books?

$\frac{7}{20}$ 7:20 7 to 20

Name: _____ Date: _____

Ratios as Fractions
N-Gen Math® 6

Guided Notes

In the last lesson few lessons, we have worked with ratios in various ways. Remember that ratios are simply a comparison of how much of one thing there is compared to another. We want to express this in a simple way. A **mathematical notation** has been invented to do so.

Showing Ratios with Colons

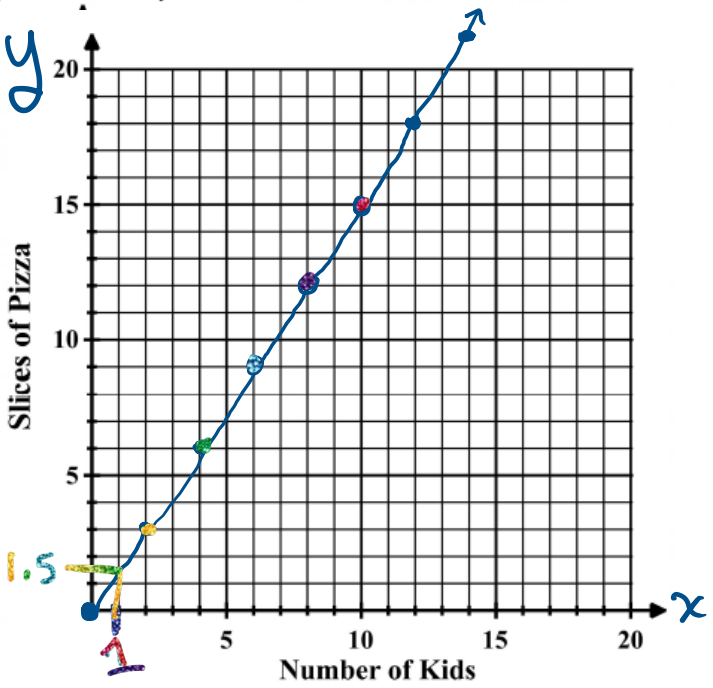
If we have a quantity of a and a quantity of b then the ratio of ***a* to *b*** is shown as: ***a*:*b***.

***Exercise* #1:** At a birthday party, the ratio of pizza slices to kids is 3:2.

(a) If there are 12 kids, how many pizza slices are there? Fill in the table below to justify your answer.

Kids	0	2	4	6	8	10	12	14
Slices	0	3	6	9	12	15	18	21

(b) Using your table from (a), make a plot of points on the grid where the number of kids is the x-coordinate and the number of slices of pizza is the y-coordinate.



(c) Connect these points with a straight line.

(d) According to the graph, how much pizza does a single kid get? How does this relate to the ratio?

Every kid gets 1.5 slices

$\frac{K}{S}\ \frac{2}{3} \div 2 = \frac{1}{1.5}$

(e) At a larger party there are 30 kids. If the ratio of pizza slices to kids stays the same, how many pizza slices will be needed?

$\frac{K}{S}\ \frac{2}{3} \times 15 = \frac{30}{45}$ slices

Besides representing ratios using phrases like "3 cats to 5 dogs" and the colon notation, 3:5, ratios are often represented by fractions. Let's see why this makes sense.

***Exercise* #2:** In a sixth-grade class 3 out of every 5 students have brown hair. The ratio of students with brown hair to all students, therefore, is 3 : 5 (3 to 5).

(a) Fill out the table below.

EQUIVALENT FRACTIONS

Brown Hair	3	6	9	12
All Students	5	10	15	20

(b) Form fractions from this table using the first row as the numerator and the second row as the denominator.

$\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}$

(c) What does each fraction reduce to?

$\frac{3}{5}$

(d) If there were 40 students in the class, how many would have brown hair based on this ratio? Fill in the missing numerator below.

B $\frac{3}{5} = \frac{?}{40}$ 24 students have brown hair

T (×8 ↗, ×8 ↗)

RATIOS AS FRACTIONS

The ratio of a to b (or $a:b$) can be represented in fraction form as $\frac{a}{b}$. This fraction represents how much you would need to multiply b by to get a.

***Exercise* #3:** The ratio of girls to boys on a coed soccer team is 4 to 3.

(a) Represent this ratio as a fraction.

$\frac{4}{3}$

(b) If there are 12 boys, how many girls are there? Show how you found your answer.

G $\frac{4}{3} \overset{\times 4}{=} \frac{16}{12}$ girls

B (×4)

***Exercise* #4:** In a popular cereal, the ratio of marshmallow pieces to wheat squares is 2:7. If Elliette's cereal bowl contains 63 wheat squares, how many marshmallow pieces should it contain? Justify your answer.

M $\frac{2}{7} \overset{\times 9}{=} \frac{18}{63}$ marshmallow pieces.

W.S. (×9 ↗)

Name: _____ Date: _____

RATIOS AS FRACTIONS
N-GEN MATH® 6 HOMEWORK

FLUENCY

1. Which of the following is not a correct way to represent the ratio 5 to 2?

(1) $\frac{2}{5}$ (3) 5 : 2

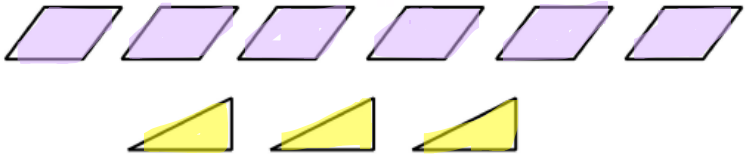
(2) $\frac{5}{2}$ (4) 10 : 4

$\frac{5}{2} \overset{?}{=} \frac{10}{4}$ (×2) (×2)

$\frac{5}{2}$ and $\frac{10}{4}$ are EQUIVALENT.

_____

2. The collection below contains parallelograms and triangles. Answer the following ratio questions about this collection of shapes.



(a) What is the ratio of triangles to parallelograms?

$\frac{3}{6}$, 3 to 6, 3 : 6

(b) The ratio in (a) is equivalent to what fraction?

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

$\frac{3}{6} = \frac{6}{12}$ $\frac{3}{6} = \frac{1}{2}$

(c) If this collection was expanded so that there were 20 parallelograms (with the same ratio as before), how many triangles would there be?

$\frac{3}{6} = \frac{?}{20}$ $\frac{1}{2} = \frac{10}{20}$ (×10, ×10)

(d) More challenging: If this collection was expanded so that there were 90 total shapes (with the same ratio as before), how many of them would be triangles? Explain.

T + P = 90

3 + 6 = 9

30 + 60 = 90

3. If the ratio of a to b is 10 to 3 then a is

(1) $\frac{3}{10}$ of b (3) 10 times b

(2) $3\frac{1}{3}$ times b (4) 3 times b

$\frac{a}{b} \frac{10}{3}$

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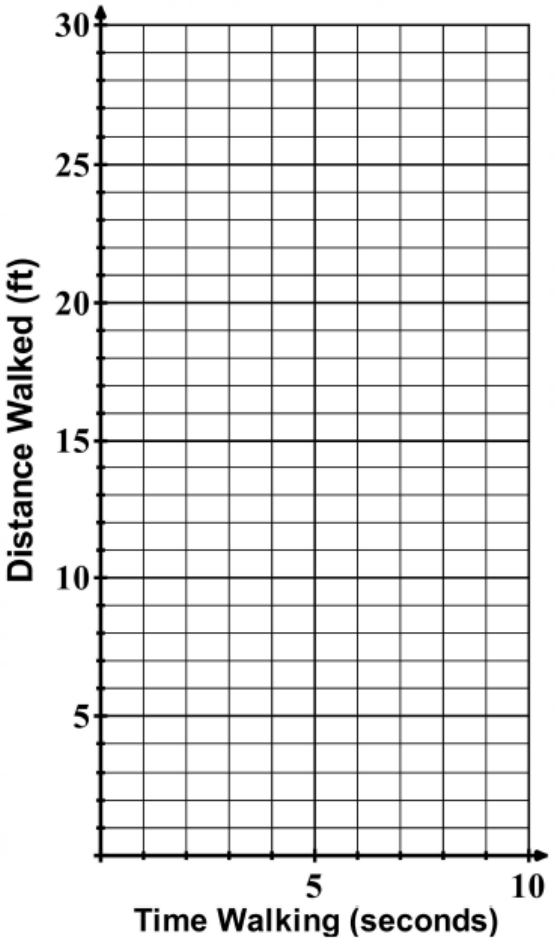
USING YOUR MATH

4. Ava is walking at a constant speed where for every 5 feet it takes 2 seconds. So, the ratio of feet to seconds is 5 to 2.

   (a) Fill in the table below with times and distances.

Time (seconds)	Distance (feet)
0	0
2	5

   (b) Plot the rows of the table above on the grid paper, where the x-coordinate is time and the y-coordinate is distance. Connect with a straight line.



   (c) How many feet does Ava walk in one second? How does this relate to the ratio?

5. In a group of people, for every 20 people, 7 of them have blue eyes.

   (a) Write the ratio of the number of people with blue eyes to the total number of people in fraction form.

   (b) If there are 100 total people, how many of them have blue eyes? Explain how you found your answer.