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***.

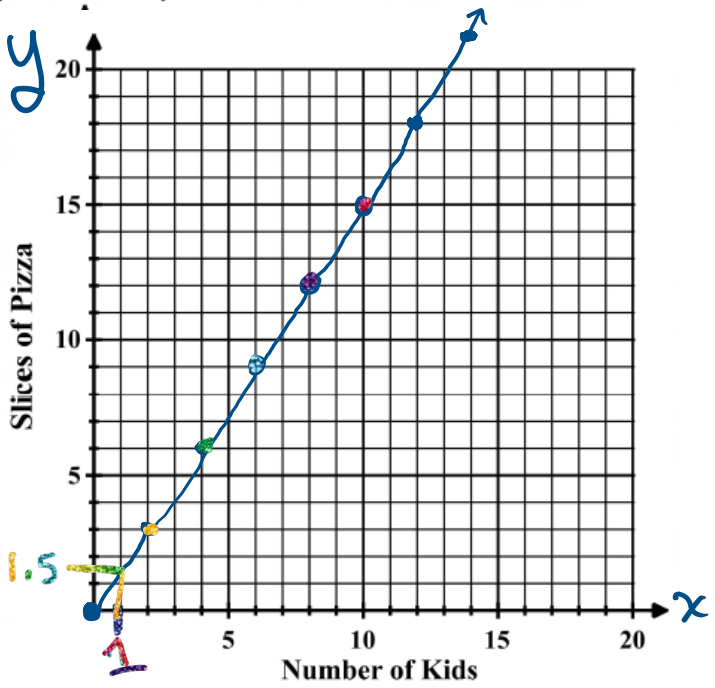
***Exercise* #1:** At a birthday party, the ratio of pizza slices to kids is 3:2.

(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

slices

(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

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

(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?

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

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

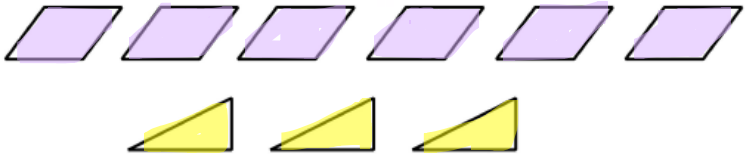
(2) $\frac{5}{2}$ (4) 10 : 4

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

$\frac{5}{2}$ 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

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

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

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

(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)

(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

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

_____

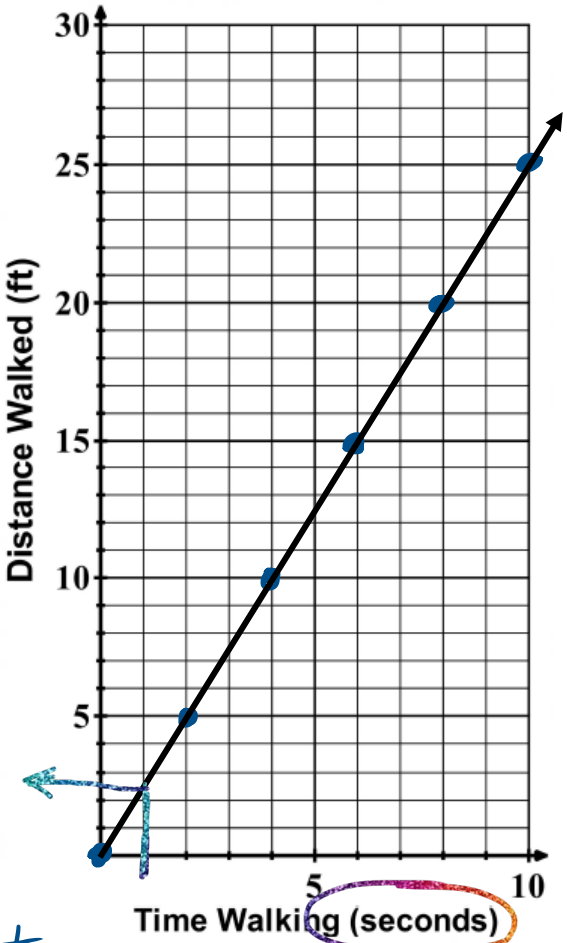
USING YOUR MATH

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
4	10
6	15
8	20
10	25

   (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?

$\frac{5}{2} \div 2 = \frac{2.5}{1} \div 2$

1 second = 2.5 feet (unit rate)

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.

$\frac{7}{20}$

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

$\frac{7}{20} \times 5 = \frac{35}{100}$ (×5)