

Name: _____

Date: _____

RATIOS

N-GEN MATH[®] 7



Ratios are one of the most important ideas in all of math. The concept relates the amount of one quantity there is in a situation per the amount of another quantity.

Exercise #1: A large fruit basket contains 21 apples and 14 oranges.

- (a) What is the ratio of apples to oranges in simplest form? Use a fraction to help think about this problem.
- (b) A smaller fruit basket has the same ratio of apples to oranges as the large fruit basket. If it has 10 oranges in it, how many apples does it have?

We can **scale** ratios up or down depending on need by multiplying and dividing. This is why the use of fractions to represent ratios is so common.

Exercise #2: The ratio of cats to dogs at a pet shelter is 5:2. Answer the following questions.

- (a) Fill in:
For every _____ dogs there are _____ cats.
- (b) If there are 12 dogs then how many cats are there? Show or explain how you arrived at your answer.
- (c) If there are 45 cats at the shelter how many dogs are there? Show or explain how you arrived at your answer.
- (d) Given this ratio, explain why could there not be 7 dogs at the shelter?



A closely related idea to ratios is that of the **unit rate** which we have discussed before. A **unit rate** can be produced from any ratio by simply dividing the two quantities in the ratio.

UNIT RATES

A **unit rate** is a **ratio** where the amount of one quantity is given per **single unit** of another quantity. We find this unit rate by dividing one quantity in the ratio by the other.

Exercise #3: A cake recipe calls for 4 cups of flour and 2 cups of sugar.

- (a) Express the unit rate of cups of flour per cup of sugar. (b) Express the unit rate of cups of sugar per cup of flour.

Because unit rates are produced using **division** it is often the case that they are decimal in nature.

Exercise #4: A person is walking at a rate of 9 feet every 4 seconds.

- (a) Find their speed, i.e. the unit rate of the distance they travel per second. (b) Given the rate in (a), how far would this person travel in 14 seconds.

Exercise #5: Kirk is reading a book and found that after 5 days he had read 180 pages.

- (a) At what rate is Kirk reading the book in units of pages per day? (b) If the book is 765 pages long, how many days will it take him to read the book at the rate you found in (a)?



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RATIOS
N-GEN MATH[®] 7 HOMEWORK

FLUENCY

1. A ratio of 28 to 12 can be expressed in simplest form as:

(1) 8:5

(3) 7:3

(2) 9:4

(4) 14:9

USING YOUR MATH

2. At a swimming pool the ratio of those wearing sunscreen to those not wearing sunscreen was 7 to 5. If the number of people not wearing sunscreen was 30 then which of the following was the number of people who were wearing sunscreen?

(1) 25

(3) 38

(2) 36

(4) 42

3. On a recent math quiz, 20 of the 32 students who took the quiz used a pen and the rest used a pencil. Which of the following is the ratio of the students who used a pen to those who used a pencil?

(1) 5 to 3

(3) 8 to 5

(2) 5 to 8

(4) 13 to 8

4. Water is pouring out of a leaking pipe. In one hour, 1,380 gallons came out of the pipe. Which of the following is the rate that water is flowing out of the pipe in gallons per minute?

(1) 19

(3) 27

(2) 23

(4) 32



5. At an ice cream social, 56 people ordered chocolate ice cream while 32 people ordered vanilla ice cream.
- (a) What is the ratio of the number of people who ordered chocolate to the number of people who ordered vanilla in simplest terms?
- (b) At a different event, 42 people bought chocolate and 30 bought vanilla. Does this event have the same ratio of chocolate to vanilla purchases as the ice cream social from (a)? Justify.
6. Zuri is stuck in traffic. She notices that she only drove 3 miles in 15 minutes.
- (a) Find Zuri's speed in miles per minute. Express your answer as a decimal (which will be less than 1).
- (b) If Zuri continues to travel at this speed, how far will she travel in one hour? Show your work.
7. A town's population grew from 7,500 people to 8,210 over a span of 10 years. Answer the following questions.
- (a) By how many people did the population grow in those 10 years?
- (b) What is the rate of growth in people per year for those 10 years?
- (c) If the population continues to grow at this rate for the next 20 years, will it be above 10,000? Justify your answer.

