UNIT 8

Ratios, Rates, and Proportions

CCM6 and CCM6+ 2016-17

Name: _____

Math Teacher: _____

Projected Test Date: _____

Unit 8: Ratios, Rates & Proportions

equivalent ratio	ratios that name the same comparison
rate	compares two quantities that have different units of measure
ratio	a comparison of two quantities using division
unit rate	a rate in which the second quantity in the comparison is one unit
tape diagram	a drawing that looks like a segment of tape, used to illustrate number relationships; also known as a strip diagram, bar model, fraction strip, or length model
cross product	the product of numbers on the diagonal when comparing two ratios
proportion	an equation stating two ratios are equivalent
proportional	term used when two ratios are equivalent

Sugar Packets

Part One: Watch the video at http://threeacts.mrmeyer.com/sugarpackets/

Part Two: Answer these questions.

1. How many sugar packets do you think are inside a 20-oz bottle of soda?

2. Give an answer that you know is too high.

3. Give an answer that you know is too low.

4. What information do you need to solve the problem?

5. Solve it!

Part Three: Watch the rest of the video at the bottom link of the website from Part One.

5. What kind of food might have 50 sugar packets? 3 sugar packets?

Part Four:

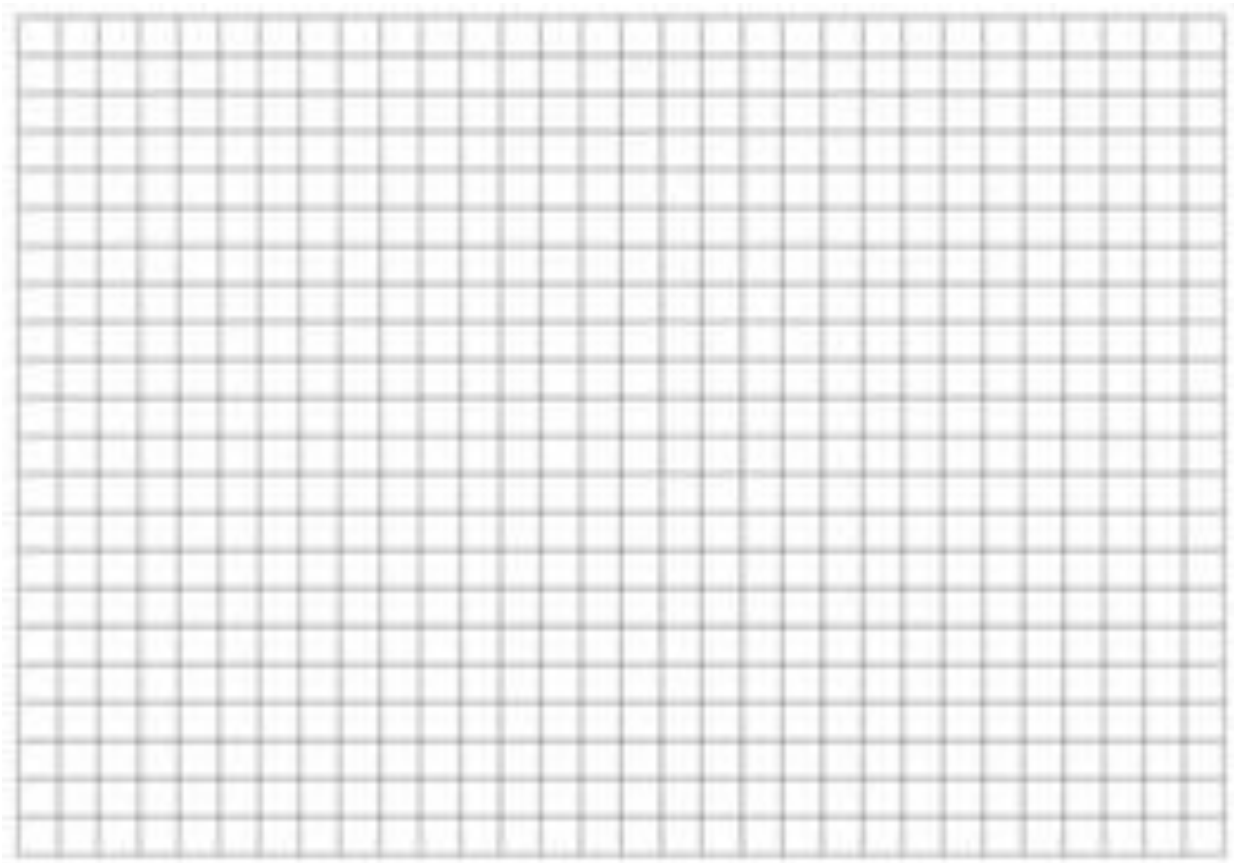
Given what you've learned about soda and the amount of sugar packets, rank the drinks shown below from least sugar to highest. Just predict—don't calculate yet.

Your prediction:

Now actually calculate the amount of sugar in each drink.

Graph your results on the grid below to display them.

Label your graph!



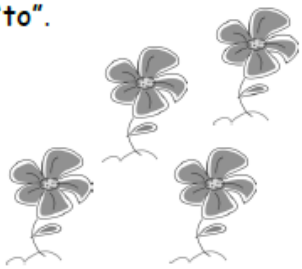
What Type of Ratio?

Identifying Ratios

Directions: Write the correct ratio.

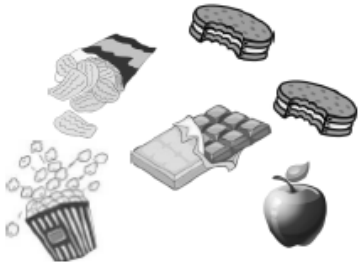
1) Write a ratio of balloons to airplanes using a colon.

2) Write a ratio of leaves to flowers using the word "to".



3) Write a ratio of buttons with only two holes to all buttons using a fraction bar.

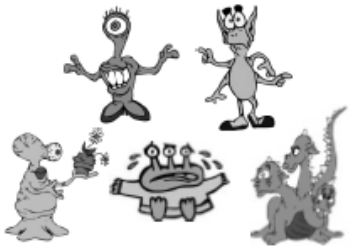
4) Write a ratio of cookies to all snacks using a colon.



5) Write a ratio of bones to ears using the word "to".

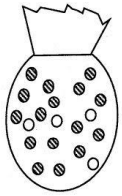
6) Write a ratio of doctor's hands to patients using two different formats.

7) Write a ratio of one-eyed aliens to all aliens using two different formats.



8) Write a ratio of houses to windows using two different formats.

RATIOS NOTES

Big Ideas	Notes	Examples
Ratio	A ratio is a comparison of two things in the same unit.	There are 2 peanut butter sandwiches for every 3 turkey sandwiches.
3 ways to write a ratio	1. as a _____ 2. with a _____ ( ) 3. with the word "_____"	1. 2. 3.
part-to-part ratio	Each number is a _____ of the entire set. **Your final answer should be _____.	a) In a gumball machine there are only red and purple gumballs. If there are 20 gumballs in the machine and 12 are red, what is the ratio of purple to red? b) What is the ratio of white to dark gumballs?  Why are these part-to-part?
part-to-whole ratio	This is always a _____ compared to the entire set. **Your final answer should be _____.	 Super Flying Pets What is the ratio of cats to all animals? Why is this part-to-whole?

Ratio Tables

1. My lemonade has a ratio of 2 lemons to 3 cups of water. If I want to have 20 cups of lemonade, how many lemons do I need?

Lemons	Total
2	5
?	20

Using the ratio table, I can see looking at the whole that 5 * 4 = 20, so to find how many lemons I need I would do 2 * 4 = ____. So I need _____ lemons for 20 cups of lemonade.

2. The SPCA must keep a 2:5 ratio of cats to dogs. If they have 12 cats, how many dogs should they have? Write the answer in the chart.

Cats	Dogs
2	5
12	?

3. The school band needs a 5:4 ratio of flutes to clarinets. If there are 27 students total who play the flute or clarinet, how many play the flute? Write your answer in the chart.

Flute	Total

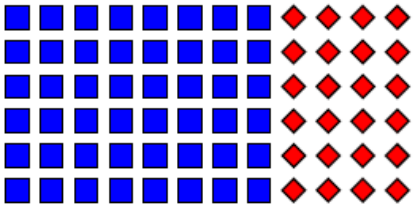
4. Megan charges $28 for 3 hours of swimming lessons. How much does Megan charge for 2 hours of swimming lessons? Write your answer in the chart.

Hours	Cost

Find the Ratios

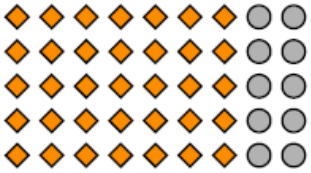
What is the ratio of ● to ♡ ? = ____ : ____ = ____ : ____ (Simplified)

What is the ratio of ♡ to (● + ♡) ? = ____ : ____ = ____ : ____



What is the ratio of ■ to ◆ ? = ____ : ____ = ____ : ____ (Simplified)

What is the ratio of ◆ to (■ + ◆) ? = ____ : ____ = ____ : ____



What is the ratio of ◆ to ● ? = ____ : ____ = ____ : ____ (Simplified)

What is the ratio of ● to (◆ + ●) ? = ____ : ____ = ____ : ____

What is the ratio of ★ to ✚ ? = ____ : ____ = ____ : ____ (Simplified)

What is the ratio of ✚ to (★ + ✚) ? = ____ : ____ = ____ : ____

Name_____

Date_____

Types of Ratios

Example: Gretchen checked out 3 mystery novels and 2 adventure novels from the library.
3:2 and 2:3 are part to part 3 to 5 and 2 to 5 are part to whole 5/3 and 5/2 are whole to part

Directions: 1) Write each statement as a ratio. 2) Circle the type of ratio for each statement.

Answer the following:

1) 5 out of 10 students know Spanish. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

2) It rained 6 out of the last 10 days in April. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

3) Out of 15 runners, 13 finished the race. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

4) We planted 8 sunflowers and 10 hollyhocks. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

5) Wheels on a bicycle to wheels on a tricycle. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

6) There is one backpack for every two students. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

7) Luke scored 3 of the 7 goals in the soccer game. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

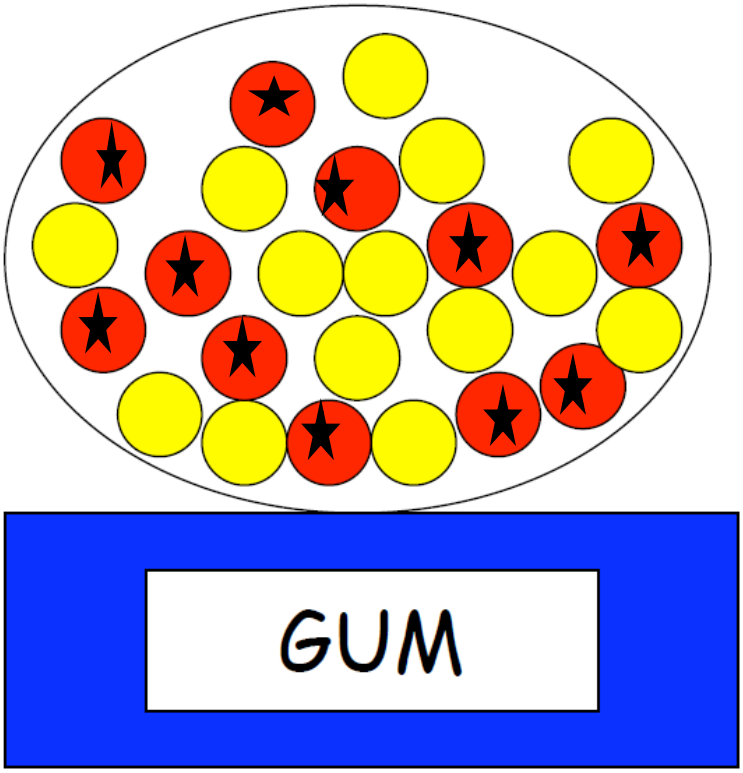
8) Out of 4 bedroom walls Cynthia painted 3 pink. Write as a ratio. _____
What type of ratio is this? whole to part part to part part to whole

9) Mika collected 3 ladybugs, 4 caterpillars, and 5 pill bugs. Write a ratio of ladybugs to total bugs. _____
What type of ratio is this? whole to part part to part part to whole

10) Dominic has 2 skateboards, 1 dirt bike, and 3 race bikes. Write as a ratio of dirt bikes to race bikes. _____
What type of ratio is this? whole to part part to part part to whole

Gumball Machines Task #1

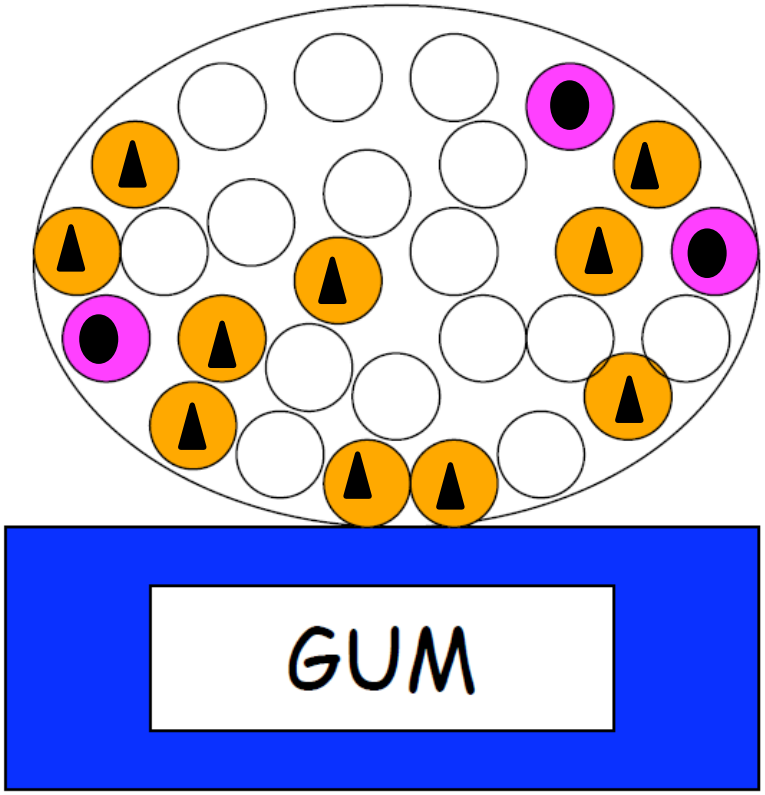
The Gumball Company fills machines so that for every three red gumballs there are four yellow gumballs.



The quality control manager noticed that this machine was not filled correctly. What should be done to correct this situation so that for every three red gumballs there are four yellow gumballs? Show your solutions and explain how you found these solutions.

Gumball Machine Task #2

The Gumball Company fills machines so that for every three orange (O) gumballs, there are one pink (P) and four white (W) gumballs in the machine.



This machine is does not meet the standard required by the company. What can be done to this machine so that it will pass inspection by the company quality control manager? Explain how you solved the problem.

What is a rate? How is it useful?

RATES and UNIT RATES

Key Word	Definition	Examples
Rate	A rate is a _____ comparing two things that are different _____. Rates have to be _____, too! ____ per ____: $\frac{first\ is\ on\ top}{second\ is\ on\ bottom}$ = first # ÷ second #	a) The car went 120 miles on 4 gallons. b) To make 24 cookies you need 2 eggs in the recipe. Why are these examples RATES not RATIOS?
Unit Rate	A unit rate is a special kind of rate where you _____ to get a number of this unit per _____ of that unit. Unit Rates help you find the _____ _____ at the grocery store. If your unit rate is a price, it is called a _____ _____. This is the _____ per ____ of the items. Unit Price = _____ ÷ the # of items **Use a calculator to divide!**	a) Dear Aunt Sally drove 84 miles in 3 hours. What was her average speed in <u>miles per hour</u>? b) The grocery store is selling a 6-pack of Hershey bars for $3.94. What is the <u>price per bar</u>? c) Usain Bolt's world record run is 100 meters in 9.58 seconds. How many <u>meters per second</u> is this? d) Food Lion sells a dozen donuts for $3.49. Currently they are half-price. What is the normal price per donut? What is the sale price per donut?

Practice with Unit Rates

MATHSCAPE BUYER BEWARE

Lesson 1: What's the Best Buy?

Hot Words:

Unit Price: _____

Rate: _____

Shoppers need to be able to calculate unit prices to find the best buy. In this lesson you will compare various-sized packages of cookies made by the same company to decide which size is the best buy. Then, you will compare two different brands of chocolate chip cookies to decide which one gives you more cookie for your money.

The Buyer Beware Consumer Research Group has collected data on chocolate chip cookies. They want you to find out which package of Choco Chippies is the best buy.

To find the best buy, you need to find the unit price, or the price per cookie, for each size package. You can find the price of one cookie in a package if you know the total amount of cookies in the package and the price of the package.

Snack Size **Regular Size** **Family Size** **Giant Size**

Use the chart on the next page to answer the following questions.

1. Use a calculator to figure out the price per cookie for each package. Round your answers to the nearest cent.

2. Decide which package size is the best buy. Explain how you figured it out.

3. List the different Choco Chippies package sizes in order from best buy to worst buy.

Choco Chippies Prices				
Package Size	**Number of Cookies**	**Package Price**	**Price Per Cookie**	**ORDER Best to Worst**
Snack	4	$0.50		
Regular	17	$1.39		
Family	46	$3.99		
Giant	72	$5.29		

How did you figure out the order of best to worst prices of cookies?

Did this surprise you? Why or why not?

At Buyer Beware magazine, we frequently get letters from our readers asking questions about best buys. Here is one of the letters we received:

> Dear Buyer Beware,
>
> Help! My friend and I don't agree on which brand of cookies is the best buy. She's convinced that it's Mini Chips, but I'm sure it's Duffy's Delights. Which is really the better buy?
>
> The Cookie Muncher

The research group at Buyer Beware has put together Cookie Prices data for you to use.

1. Find the price per cookie and the price per ounce for each brand and put these into the chart.
2. Compare your findings to decide and justify which you think is the better buy.

Cookie Prices					
Brand	**Package Price**	**Number of Cookies**	**Package Weight**	**Price per Cookie**	**Price per Ounce**
Mini Chips	$1.39	17	6 oz		
Duffy's Delights	$2.29	10	11 oz		

Which is the better buy? JUSTIFY your answer.

Unit Rates and Better Buy PRACTICE

Use your calculator to find the unit price for each of the following. Round answers to the nearest cent.

1.	7 oz of crackers for $1.19	$ per cracker
2.	14 oz of cottage cheese for $1.19	$ per ounce
3.	16 boxes of raisins for $5.60	$ per box

Find the better buy based on unit price.

4. A 35-oz. can of Best Brand Plum Tomatoes is on sale for $0.69. A 4-lb can of Sun Ripe Plum Tomatoes is $1.88.

5. A can of Favorite Dog Food holds 14 oz. Four cans are $1.00. The price of **three cans** of Delight Beef Dog Food, **each containing 12 oz**, is $0.58.

6. For each item in the chart below, calculate the unit price and circle the better buy.

	Item	**Jefferson Auto Stores**	**Tom's Auto Parts**
a.	oil	12 qt for $10.99 $_____ per quart	6 qt for $5.99 $_____ per quart
b.	anti-freeze	12 oz for $3.79 $_____ per ounce	6 oz for $1.79 $_____ per ounce
c.	auto wax	6 cans for $14.29 $_____ per can	5 cans for $12.98 $_____ per can

CHALLENGE

7. Six cans of fruit drink are on sale for $1.95. Individually, the price of each can is $0.35. How much does Tanya save buying 6 cans on sale?

8. Tubes of oil paint can be bought in sets of 5 for $13.75 or bought separately for the unit price. What would be the price of two tubes of this oil paint?

Graphing to compare prices, and comparing prices from graphs

WARMUP:

Use the table to answer the following questions:

	Teachers	**Students**
School A	95	1,710
School B	86	3,096
School C	110	3,080

**Use a calculator!

1. What is the ratio of teachers to students in School A?

2. What is the ratio of teachers to students in School B?

3. What is the ratio of teachers to students in School C?

4. What is the ratio of ALL teachers to ALL students?

5. What is the ratio of students per teacher in School A?

6. What is the ratio of students per teacher in School B?

7. What is the ratio of students per teacher in school C?

8. Which school would you rather attend? Why?

9. Why are these all <u>ratios</u>? (Not rates)

MATHSCAPE BUYER BEWARE

Lesson 2: The Best Snack Bar Bargain

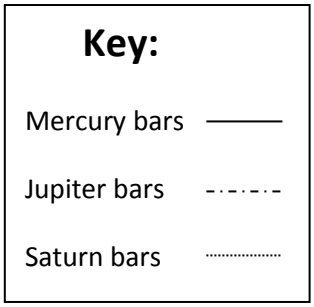
You can use a price graph to compare unit prices for different products. In this lesson you will use a price graph to determine the price at different quantities of a snack bar if you were paying by the ounce. Then you will construct a price graph to compare the prices of five different products.

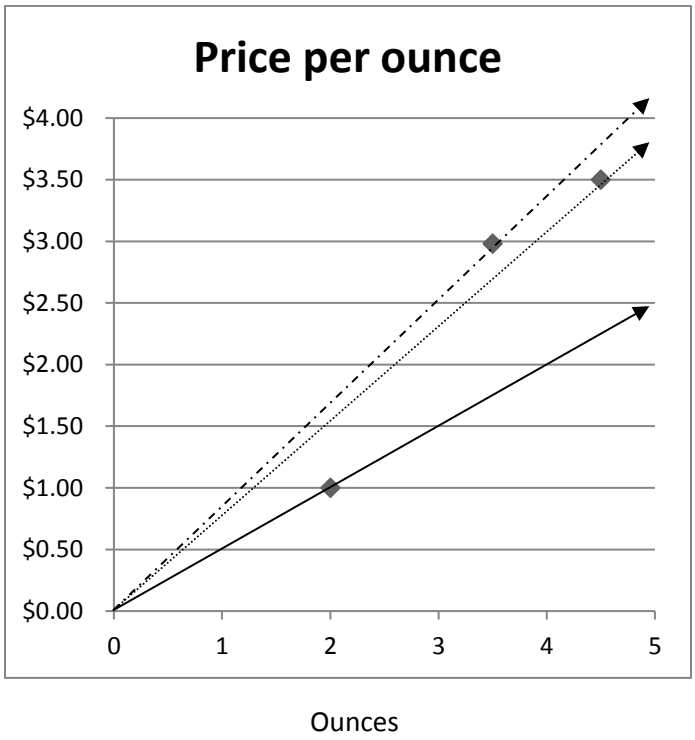
Use a Price Graph to Find Unit Price

The graph below shows the prices for three different snack bars:

Mercury bars are $1.00 for 2 oz.
Jupiter bars are $2.98 for 3.5 oz.
Saturn bars are $3.50 for 4.5 oz.

Each of the three dots on the graph shows the price and the number of ounces for one of the snack bars. Each line shows the price of different quantities of the snack bar at the same price per ounce.





1. What is the price of a 3-oz Mercury bar?

2. What is the price of a 0.5-oz Saturn bar?

3. Which snack bar has the lowest unit price?_____ Highest unit price? _____
   How do you know this by just l  king at the graph?

4. What are the unit prices for each bar? Hint: Find the price per ONE OUNCE.
   Mercury: $_____/oz Jupiter: $_____/oz Saturn: $_____/oz

RELATING TABLES AND GRAPHS

	Oatmeal	Tuna	Penne Pasta	Sourdough Pretzels	Whole Wheat Rolls
1 oz					
3 oz					
7.5 oz		$2.00			
8 oz			$1.00		
9 oz					$1.60
12 oz				$2.60	
14 oz	$2.40				

Graph the information onto your own price graph. Use different colors or styles of lines for each item.

KEY:

_____ = Oatmeal

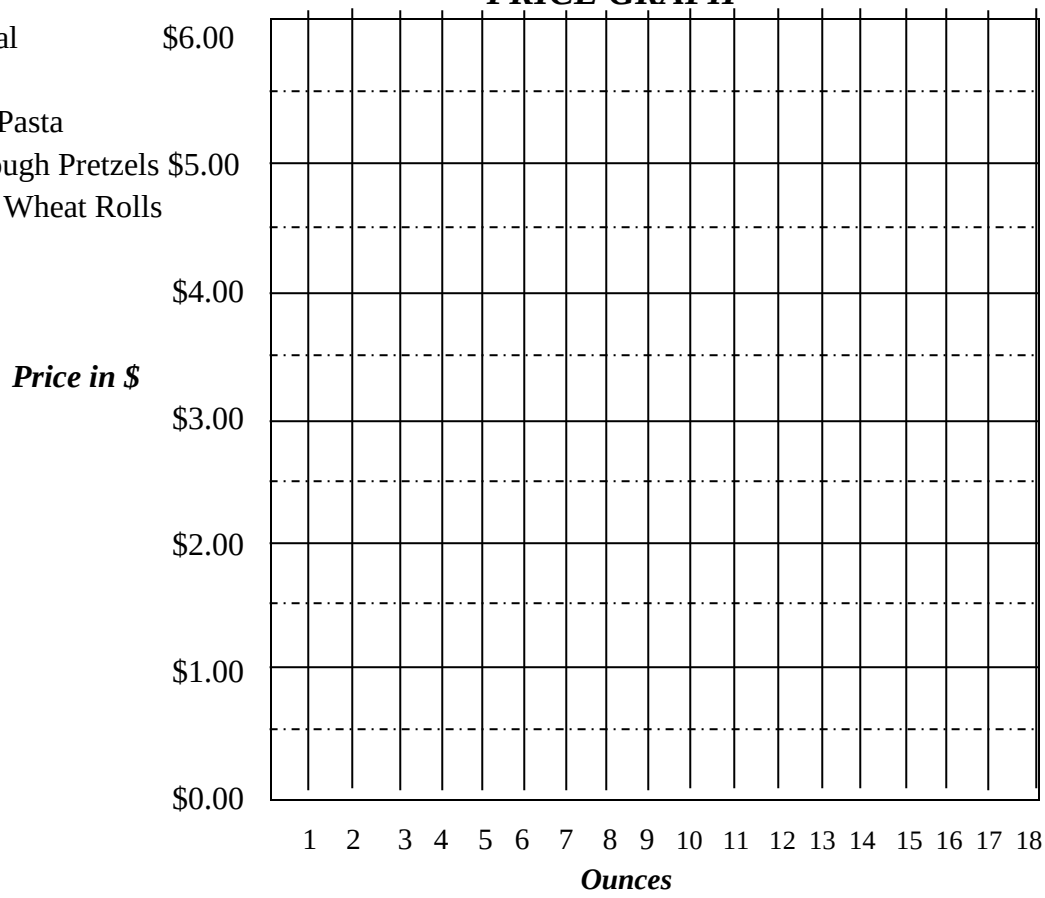
_____ = Tuna

_____ = Penne Pasta

_____ = Sourdough Pretzels

_____ = Whole Wheat Rolls

PRICE GRAPH



1. Graph the prices per ounces shown in the chart above. For each item, use a different color or style and connect the point created to the origin (0 oz, $0).

2. Using your graph, estimate the missing values above in the chart.

3. The most expensive product per ounce is _____ because _____.
4. The least expensive product per ounce is _____ because _____.

5. Besides looking at your price graph, what is another way you could have used the information in the table to fill in the missing values in the chart?

6. Using your price graph, about how much would you pay for 6 ounces of sourdough pretzels?

7. Using your price table, about how much would you pay for 5 ounces of whole wheat rolls?
   (Hint: look at the price per one ounce and then use that to calculate the price per five ounces.)

8. Crabtree Middle School is holding a fundraiser dinner for 2,000 people. If the students need to cook 4 ounces of pasta per person, how much will it cost to buy enough penne pasta for the fundraiser? *Hint: First find the cost for 4 ounces….that's for one person….you need it for 2,000 people!*

9. While shopping for oatmeal, Daphne's mom finds another brand of oatmeal on sale for $2.65 for 16 ounces.
   a. Which oatmeal is the better buy?
   b. How much will she save buying the better buy instead of the other brand (for 16 ounces)?
   SHOW YOUR WORK!

10. Shamik's family is moving from Raleigh, NC, to Los Angeles, CA. They have to drive 2,520 miles. His dad says he knows he can drive 360 miles in 6 hours. If Shamik's family drives 8 hours per day, about how many days of driving will it take for them to drive from Raleigh to Los Angeles?
    Hint: Find the unit rate (miles per hour)….then the amount of miles per day (unit rate x 8 hours)…then calculate the amount of days for 360 miles.

Use Double Number Line Diagrams to work with Rates

WARMUP:

1) A group of students is spending the day at the county carnival. Stores around the area are selling booklets of discounted carnival ride tickets. The stores' ticket prices are as shown:

- Farm Fresh: 15 tickets for $12.50
- Save-a-Lot: 20 tickets for $16.00
- Mini-Mart: 25 tickets for $19.79

Which store offers the best deal? Justify your choice!

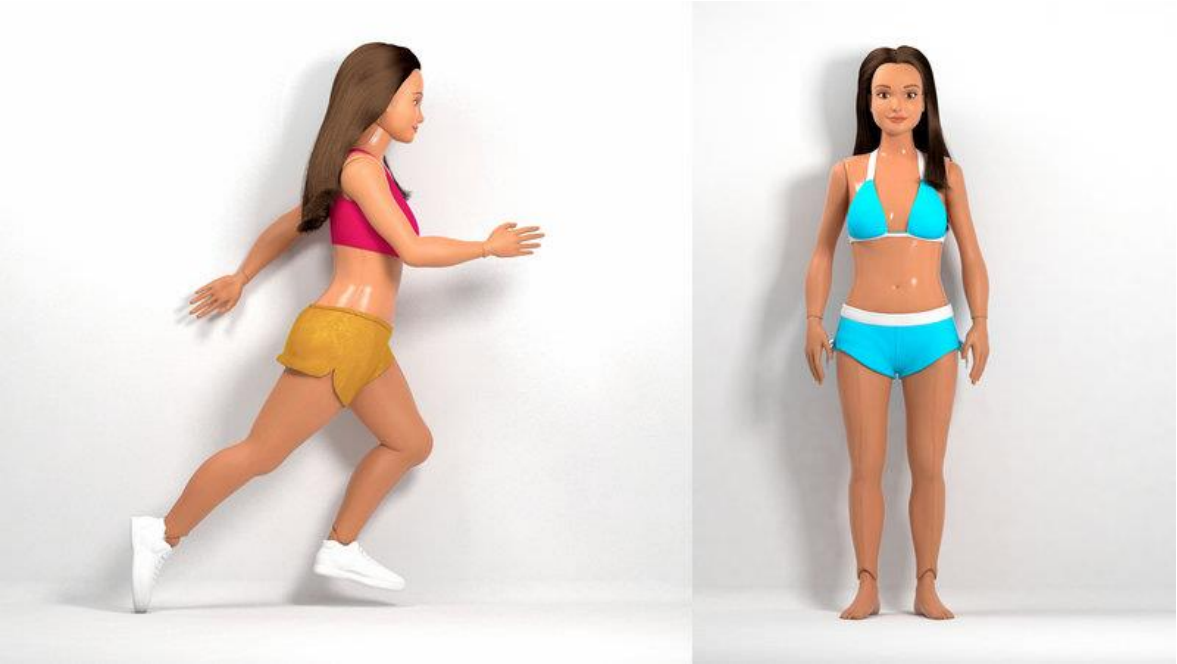
2) Karen and four friends had 175 tickets. After they each rode The Screamer five times, all of the tickets were gone.

- How many tickets does it cost for one person to ride The Screamer one time?

- At this rate, how many tickets will it take for Karen to ride The Screamer five more times?

Could A 'Barbie' Get Real? What A Healthy Fashion Doll Looks Like

MICHAELEEN DOUCLEFF April 4, 2014



Look familiar? Artist Nickolay Lamm designed a doll to look like the average 19-year-old walking — or running — on the street.*Courtesy of Lammily*

For decades, the Barbie doll has been slammed by parents for promoting an unhealthy female body image. Playing with a Barbie doll for just a few minutes may cause girls to limit their career ambitions, psychologists reported last month.
So why do we keep offering girls bone-thin dolls like Barbie and the popular Monster High crew, asks artist Nickolay Lamm? He thinks it's time for a Barbie to get real.

Hello world: This concept for the "normal" fashion doll wears minimal makeup, jean shorts and a simple blouse.
Courtesy of Lammily

Lamm has raised nearly half a million dollars to produce a Barbie-like doll with the proportions of a real teenager. He designed the doll using the dimensions of the average 19-year-old, given by the Centers for Disease Control and Prevention.

"Then I smoothed out some of the details," Lamm, 25, tells Shots. "I just wanted her to look like a typical young woman walking down the street. But I left the actual dimensions ambiguous because I don't want to set a new standard."

Lamm says he was inspired to create the doll for his cousin. "She's so beautiful, but she was afraid to put on a bathing suit because she thought she was fat. And of course she's not," he says. "But then when I look at the dolls in the store [she has to select from], they're almost these mythical things."

To have Barbie's physique, the average young woman would need to grow about 5 inches, trim 17 inches from her waist and slim her neck by a half a foot, the artist says.

Here's the bad news for parents seeking healthier alternatives: Right now Lamm's doll exists only as a digital design. But he has been working with a former vice president at Mattel to construct a prototype. With the funds he raised, he's starting a company, Lammily, to produce the first edition of the dolls — which have already sold out. Don't worry, though. Lamm wants to make a whole series of the dolls with a variety of ethnicities and healthy shapes. "I see there being a bunch of dolls to represent all of us," he says. He also plans for the dolls to wear less makeup than Mattel's Barbie and have more realistic clothes.

"I think the doll is fantastic!" says psychologist Aurora Sherman at Oregon State University, who led the recent study on Barbie's impact on girls' career ambitions.
Scads of studies have looked at how media images of unrealistic body shapes negatively affect girls' self-esteem and body satisfaction, Sherman says. But only a handful have focused on Barbie.

"From a scientific perspective, we don't know very much about how Barbie affects girls," she says. "Parents and philosophers have had a lot of opinions on Barbie, but there are very few studies that use Barbie in a scientific way. "

To start filling in that gap, Sherman and her colleagues ran a small study in which they gave 37 girls ages 4 to 7 a Barbie or a Mr. Potato Head to play with for five minutes. They then showed each girl photos of job situations, such as firefighting, piloting a plane or teaching. They asked each girl which jobs could be done by boys or by herself.

After playing with Barbie, the girls said that boys could do about 2.5 more jobs than themselves. But girls who played with Mr. Potato Head didn't distinguish between jobs for boys or themselves, Sherman and her colleagues reported in a journal.

Of course, with such a small study it's hard to draw conclusions about girls in general. "We don't know what 37 girls from around Corvallis, Ore., tell us about the billions of girls in the world," Sherman says. "But girls play with Barbie hours a day. That cumulative impact couldn't be smaller than what we saw."

It would be good to give girls and parents other options, Sherman says.

Write your reaction to the article you just read here.

Would you buy a “Lammily” doll? Why or why not?

Do the proportions of toys matter? Explain. Can you think of other examples?

http://www.kansas.com/living/family/article1137580.html

The Wichita Eagle

Barbie isn't 'normal,' but neither is Lammily, the new 'it' doll

By Jenee Osterheldt

Update: Nickolay Lamm, the creator of the Lammily doll, did not respond to our request for an interview before this column appeared. But on Tuesday he weighed in with a response:

"Some people misinterpret my saying 'average is beautiful' is to say that if you are not average you are not beautiful, but I am saying pretty much the opposite," he says. "Let's forget about the whole political correctness. If you look at the doll, she does look more normal than what is out there. I don't blame anyone for calling it normal, I don't think they are trying to offend anyone. It's a very simple way to describe her.

"But at the same time, that image of her doesn't suggest that if you don't look like her something is wrong with you. I am not trying to start a war with Barbie, I am just trying to add an alternative. I am not saying this is good or that is bad. Lammily represents the fact that everyone is beautiful. Lammily is for everyone."

Normal Barbie. Who is this new phenomenon said to be the next big thing in the toy aisle?

Her name is Lammily and she's the new "it" doll, created from the average measurements of a 19-year-old girl – about 5 feet 4 inches, with a 33-inch waist.

She's more anatomically correct than Mattel's Barbie, who couldn't function if she were human. Lammily is shorter than Barbie and Bratz. Her makeup is minimal. And her joints are bendable.

OK, so this is "normal": Lammily may not be tall and super skinny, but she is certainly fit, an athlete. We've seen her in running poses and with a ball. Her stomach is flat. Her designer, Nickolay Lamm, told the Huffington Post that he wants her clothes to have that Gap and J. Crew look. Because, you know, Lammily is like a "real" woman.

When we start using words like "normal" and "real," we are teaching girls to compare by saying this is what normal looks like in the form of a plastic mold. What if we don't have an athletic build or wear preppy clothes? What if we don't fit that mold?

Eventually the designer plans to add more ethnicities to the line, but for now Lammily is white with long, straight brown hair. She is being embraced as Normal Barbie. We are basically saying, hey, Lammily is the standard. It destroys the entire mission.

I get where Lamm is coming from. Last summer, the artist's picture of what Barbie would look like if she were based on an actual woman went viral. People loved the idea of a doll that looked more like the average gal. He started a crowdfunding campaign to raise $95,000 so he could make Lammily for the masses. He's raised $225,000 and counting.

No one can deny that body image is an issue. Unrealistic beauty standards are a problem. Eating disorders are prevalent. Half of elementary school girls are concerned about their weight. So I find it easy to support Lammily and push doll makers to put more options on the aisles.

But don't call her "normal."

"There are a lot of ways to have a real body," says Erin Brown, a Lawrence, Kan., mom and the personal trainer behind fitmamatraining.com. "I love the idea of having a doll that has measurements based on an actual woman, and it's great for diversity, but I don't like calling her 'real' or 'normal.' She's pretty fit, and she's a white person who will be wearing J. Crew or Gap clothes.

"I don't know that we have to have a doll that looks like every single person on the planet, but when we call this specific doll the Normal Barbie we're sending a message to everyone who doesn't look like her. What if she had another body type? What if she was bigger? What if she was black? Could we still call her Normal Barbie?"

"Average is beautiful," Lammily says. Yes, it is. But what is average? There is no normal. The bigger statement is everyone is beautiful. All of us.

Read more here: http://www.kansas.com/living/family/article1137580.html#storylink=cpy

Bratz Doll

Barbie Doll

Monster High Doll

Lammily Doll

Have your opinions changed about Lammily or Barbie? Explain.

Mini-Me Calculation Directions

1) Write your name on <u>your</u> calculations page.
2) Find a partner of the same gender who will not distract you from your work.
3) Get a yard stick/meter stick with inches on reverse side (use inches side only).
4) Decide who will be Partner 1: ___________ and who will be Partner 2: ______________.
5) Partner 1 measure partner 2 across ear-to-ear. Partner 2 write the measurement on YOUR page in the correct proportion.
6) Partner 2 measure Partner 1 across ear-to-ear. Partner 1 write the measurement on YOUR page in the correct proportion.
7) Continue measuring and recording for all fifteen measurements. BE SURE to record YOUR measures on YOUR paper.
8) Solve all proportions to find # squares on the graph paper.

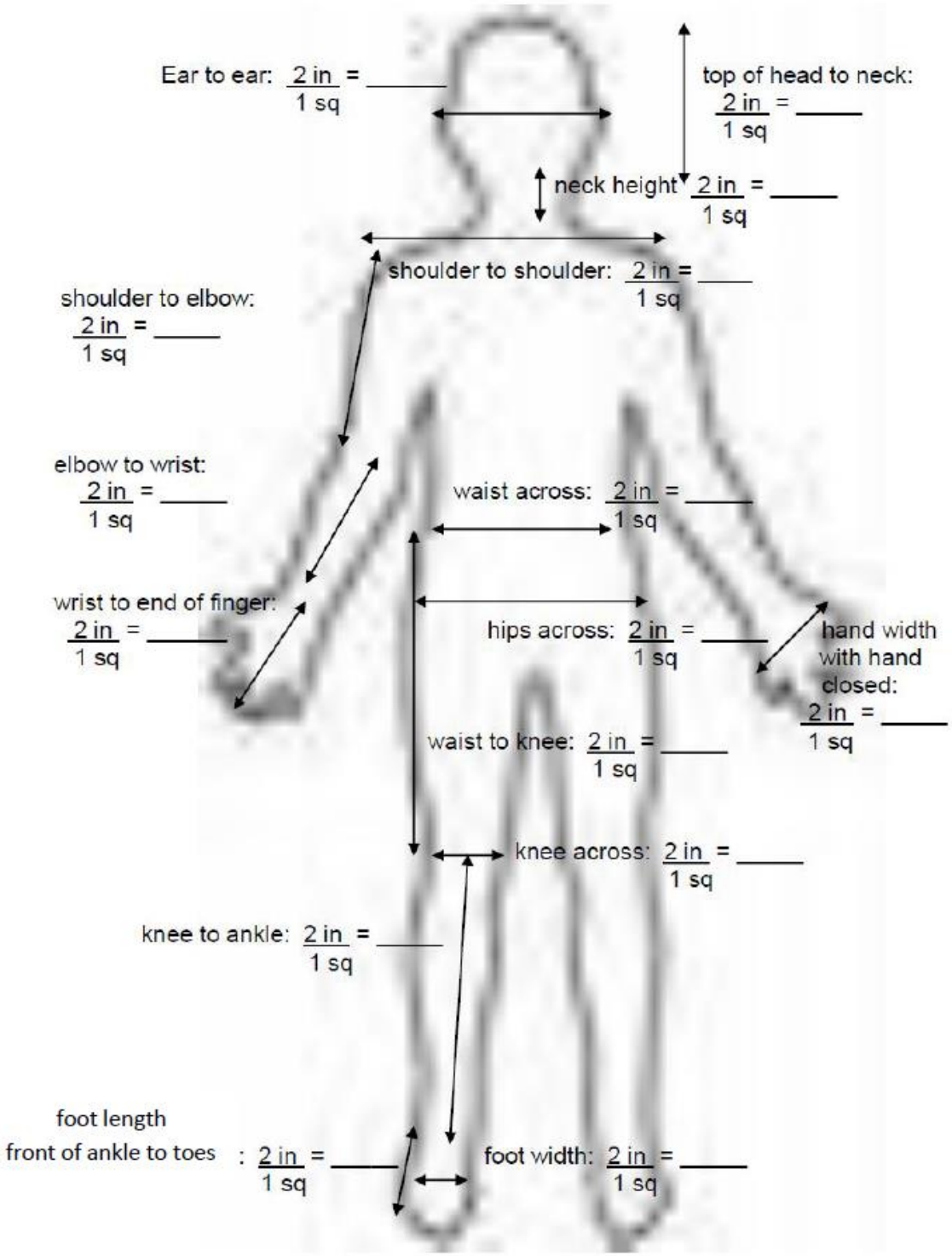
You need to finish this *<u>TODAY</u>***.

Mini-Me Drawing Directions

1) You will start drawing in the center of your graph paper three squares from the top.
2) Make a small mark for the top of your head and chin according to YOUR number of squares.
3) Make a small mark for each ear according to YOUR number of squares.
4) Sketch your head (oval shape).
5) Make a mark for neck height according to YOUR number of squares. Sketch neck.
6) Make marks for your shoulders centering under your neck according to YOUR number of squares. Sketch shoulders. Shoulders slant downward—not straight across.
7) Continue with arms to hands, then shoulder to hips, then hips to floor, using YOUR measurements converted into squares.
8) Decorate your mini-you! Add details! Be colorful and creative—they will be on display!

☺☺☺

MINI-ME PROJECT



Mini-Me Project Rubric:

Mini-Me Project Page	5 points per correct proportion for a total of 75 points
Mini-Me Drawing Page	15 points—follows measurements 10 points—designed and decorated to be like you
Total Points:	100

Ratios Review…getting into Proportions

Write each ratio as a fraction in lowest terms.

1. 6 to 8
2. 8:44
3. $\frac{60}{32}$
4. 20 to 30

Find equivalent ratios. Find a math relationship and USE IT!

5. $\frac{5}{30} = \frac{1}{\_\_} = \frac{10}{\_\_} = \frac{\_\_}{60}$

6. $\frac{12}{15} = \frac{\_\_}{5} = \frac{24}{\_\_}$

7. $\frac{30}{12} = \frac{60}{\_\_} = \frac{\_\_}{120}$

The data table below shows how some students spent their time from 4p.m. to 5p.m. yesterday.
Decide if statements #8-11 are TRUE or FALSE by seeing if they are equal ratios.

How Students Spent Their Time	
	# of Students
Homework	10
Sports Practice	5
Music Practice	5
Chores or Job	6
Other	4

8. One out of every three students did homework.

9. One out of every five students did chores.

10. The ratio of homework to music is 5 to 2.

11. The ratio of chores to music or sports is 2 to 3.

Part to Part Ratios….how are the proportions different? Make a Proportion (2 = ratios).

1. For every 5 calendars that Austin sold, Lara sold 4. Austin sold 45 calendars last month. How many calendars did Lara sell?

2. For every 3 cars that Kelly sells, Jane sells 4. Jane sold 32 cars last month. How many cars did Kelly sell?

3. The ratio of boys to girls who participated in the pie-eating contest was 7:2. There were 35 boys. How many girls participated?

4. The ratio of the length of Grace's string to the length of Peter's string is 5:6. Peter's string measures 60 inches. How long is Grace's string?

5. The ratio of blue marbles to yellow marbles is 5:6. If there are 88 marbles how many blue marbles are there? *Be careful!

6. The ratio of trucks to minivans in the parking lot is 2:5. If there are 14 trucks, how many minivans are there?

7. Noah and Hunter shared some marshmallows in the ratio 3:2. If together they have 40 marshmallows, how many did Noah have?

8. Megan created a new drink by mixing 2 parts guava juice with 5 parts mango juice. If Megan used 12 ounces of guava juice, how many ounces of mango juice would be needed?

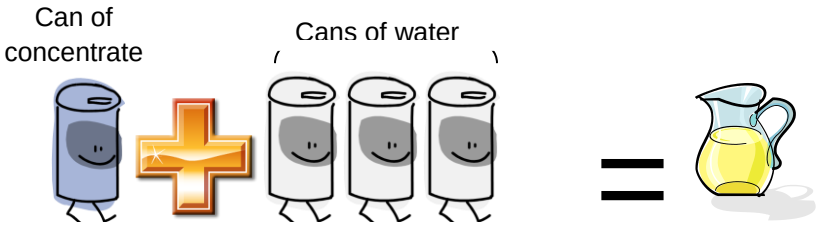
9. Kara and Sam shared a cash prize in the ratio 3:7. If the cash prize was $90, how much money did each person receive?

10. The ratio of the length of Mary's wire to the length of Ayman's wire is 5:6. Ayman's wire measures 36 inches. How long is Mary's wire?

11. The ratio of cats to dogs at the pet store is 5:6. If there are 121 total cats and dogs, how many cats and how many dogs are at the pet store?

Mixing Concentrated Drinks

There are many kinds of drinks you can buy at the store in the form of a liquid concentrate to which you add water. For example, one kind of lemonade uses 3 cans of water for each can of concentrate to make one pitcher of lemonade.



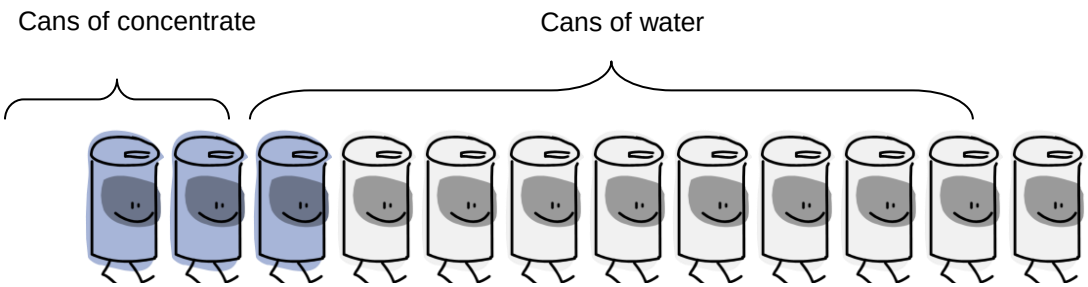
1. What is the ratio of water to concentrate? How many total cans of liquid are needed for one full batch? (Cans of concentrate are considered liquid)

2. How many total cans of liquid would you use to make 2 batches of lemonade? Set up two equal ratios to find the missing part.

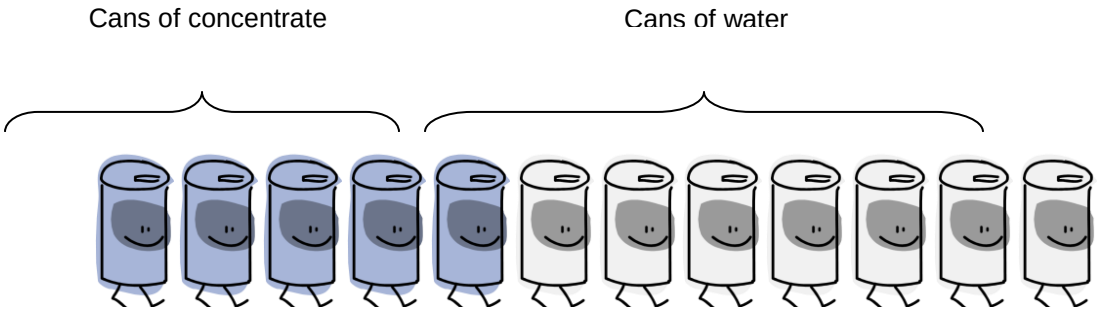
3. How would you create a bigger batch of lemonade that uses a total of 20 cans of liquid (both concentrate and water)? How many of these cans would need to be concentrate and how many cans would need to be water?

4. Three friends want to have a lemonade stand. They determine that they are going to start by making three batches of lemonade. Each explained how they want to create three batches for the stand. Do you agree or disagree with each friend's reasoning? Use a tape diagram to show why you agree or disagree with each person.

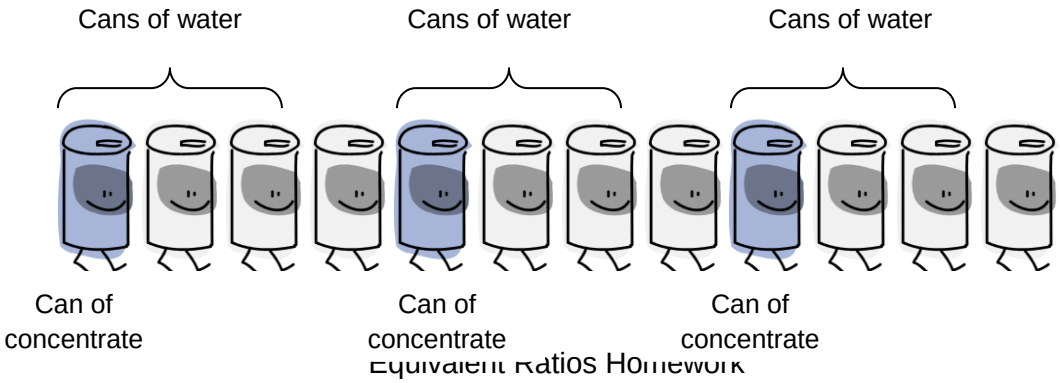
Kira: "In one batch of the lemonade, 3 of the 4 cans are water so ¾ of the lemonade is water. In my bigger batch, I'll need ¾ of the total to be water. If I triple the recipe, there will be a total of 3 X 4 or 12 cans of liquid in all. Since ¾ of 12 is 9, I'll use 9 cans of water and 3 cans of concentrate." Here is her diagram:



Tobi: "The directions call for 1 can of concentrate and 3 cans of water. Since 3 – 1 = 2, there are 2 more cans of water than cans of concentrate. In my bigger batch of punch, I'll need twelve cans in all. So I'll use 5 cans of concentrate and 7 cans of water." Here is Tobi's diagram:



Mitchell: "I'll use a pattern to figure this out. I know I need 3 cans of water for each 1 can of concentrate. I'll just keep adding 1 can of concentrate and 3 cans of water until we have three batches." Here is his diagram:



Set up two equal ratios to find the missing number.

It might help to first find a unit rate.

1. An advertisement claims that dentists that recommended the new zigzag toothbrush outnumber the dentists that don't by a ratio of 5 to 3. If 264 dentists were interviewed, how many recommended the toothbrush?

2. A quart (32 ounces) container of yogurt contains 920 calories. About how many calories would there be in a 5-ounce serving?

3. The scale on a map is 3 inches equals 4 miles. How far is the actual distance between two towns that are 12 inches apart on the map?

4. Anya's class is selling wrapping paper. For every 5 rolls they sell, they make a profit of $1.80. If her class has a goal of making a $180 profit, how many rolls of wrapping paper do they need to sell?

5. A recipe requires ¼ lb of onions to make 3 servings of soup. Mark has 1 ½ lb of onions. How many servings can Mark make?

6. The ratio of nitrogen to potassium in a sample of soil is 12:9. The sample has 36 units of nitrogen. How much potassium does the sample have?
   a. 21 units b. 27 units c. 33 units d. 48 units

7. To clean a tank, $\frac{3}{4}$cup of disinfectant is needed for every 2 gallons of water. How many cups of disinfectant are needed for 20 gallons of water?
   a. $7\frac{1}{2}$ b. 15 c. $22\frac{1}{2}$ d. 30

Track Practice

Angel and Jayden were at track practice.
The track is kilometers around.

Angel ran 1 lap in 2 minutes.
Jayden ran 3 laps in 5 minutes.

- How many minutes does it take Angel to run one kilometer? What about Jayden?

- How far does Angel run in one minute? What about Jayden?

- Who is running faster? Explain your reasoning.

Solving Proportion Notes

Let's review first: Are these proportional? 1. Cross multiply to see if equal products	Ex 1. $\frac{2}{7}$ and $\frac{6}{21}$ Ex 2. $\frac{8}{24}$ and $\frac{6}{20}$ Ex 3. $\frac{2}{8}$ and $\frac{6}{20}$
SOLVING PROPORTIONS How can you solve for the variable?	Solve for the unknown variable: Ex 1. $\frac{p}{6} = \frac{10}{3}$ Ex 2. $\frac{45}{x} = \frac{15}{3}$ Ex 3. $\frac{4}{5} = \frac{5}{w}$
More examples: Solve for the unknown variable.	4. $\frac{25}{20}$ and $\frac{45}{x}$ 5. $\frac{n}{10}$ and $\frac{28}{8}$ 6. $\frac{9}{x}$ and $\frac{57}{19}$
You can use proportions to solve real-world problems, when we cannot figure the unit rate easily. Use the information to set up a proportion and solve.	Example: A stack of 18 Jenga blocks is about 25.8 cm tall. What is the height, to the nearest tenth of a centimeter, of a stack of 11 Jenga blocks? Set up the proportion: $\frac{18}{25.8} = \frac{11}{x}$
You try this one: Carmen bought 3 pounds of bananas for $1.08. At this rate, how many pounds of bananas can she buy with $1.80?	1. Set up the proportion $__ = __$ 2. Solve the proportion.

The trick is to always correspond!

PROPORTIONS

State if each pair of ratios forms a proportion.

1) $\frac{4}{2}$ and $\frac{20}{6}$

2) $\frac{3}{2}$ and $\frac{18}{8}$

3) $\frac{4}{3}$ and $\frac{16}{12}$

4) $\frac{4}{3}$ and $\frac{8}{6}$

5) $\frac{12}{24}$ and $\frac{3}{4}$

6) $\frac{6}{9}$ and $\frac{2}{3}$

Solve each proportion.

7) $\frac{10}{k} = \frac{8}{4}$

8) $\frac{m}{10} = \frac{10}{3}$

9) $\frac{2}{x} = \frac{7}{9}$

10) $\frac{3}{x} = \frac{7}{10}$

11) $\frac{4}{9} = \frac{2}{x}$

12) $\frac{6}{a} = \frac{3}{8}$

13) $\frac{8n}{8} = \frac{8}{3}$

14) $\frac{7}{9} = \frac{a}{5}$

15) $\frac{p}{8} = \frac{13}{2}$

16) $\frac{3}{13} = \frac{v}{3}$

17) $\frac{10}{12} = \frac{2}{n}$

18) $\frac{11}{10} = \frac{r}{11}$

19) $\frac{x}{9} = \frac{7}{14}$

20) $\frac{a}{10} = \frac{11}{14}$

21) $\frac{v}{12} = \frac{10}{2}$

22) $\frac{6}{14} = \frac{5}{n}$

DAY 6 – RATIO AND PROPORTION

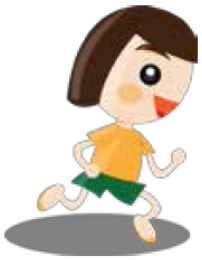
(1) The following table shows the number of boys and girls in different groups at school. Knowing that the numbers are in proportion, complete the table.

Number of boys	15		20	55		35	
Number of girls		8		44	20		4

(2) The following table shows the eggs and flower needed to bake a chocolate cake. Knowing that the ingredients are in proportion, complete the table.

Number of eggs	3	9		33		39	
Flower (kg)	0.5		1		2		2.5

(3) The following table shows the kilometers you ran last months. Knowing that you always run in the same pace (proportion), complete the table.



Kilometers	7	6		15		3	
Time (minutes)		39	65		26		71.5

Day 6 HW: Proportions

Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L ?

Use a calculator to do each exercise. Find your answer and notice the word next to it. Write this word in the box containing the letter of the exercise.

I. Solve. Round each answer to the nearest tenth.

(A) $\frac{7.5}{12} = \frac{4.2}{x}$

(B) $\frac{15}{8} = \frac{80}{x}$

(C) $\frac{6}{9.4} = \frac{x}{32}$

(D) $\frac{7.9}{x} = \frac{1}{25}$

(E) $\frac{12}{x} = \frac{3.14}{1}$

(F) $\frac{x}{58} = \frac{37.5}{100}$

II. Solve. Round each answer to the nearest whole number.

(G) Tom's red bicycle travels 50 ft for every 3 pedal turns. How many pedal turns are needed to travel a mile (5,280 ft)?

(H) For a survey, a company decided to call 7 out of every 5,000 people. How many people should be called in a town of 78,000 people?

(I) Gloria Trench checked her gas mileage and found that she had used 16.6 gal of gas to travel 372 mi. At this rate, how many gallons will she use to travel from San Francisco to Washington, D.C., a distance of 2,850 mi?

(J) A U.S. nickel contains 3.9 g of copper and 1.2 g of nickel. How many kilograms of copper must be combined with 500 kg of nickel to make nickel coins?

(K) On the stock exchange, 100 shares of Pizzazz Corp. stock are selling for $425. How many shares can be purchased for $1,000?

(L) At Paul Bunyon's logging camp, the cook scrambled 20 eggs for every 3 loggers. How many eggs did he need for the 288 loggers at the camp?

24.7 PIECES
21.8 STORIES
1,840 FAINTED
197.5 DROPPED
19.6 THAT
1,625 CAN
6.7 THE
116 BOX
20.4 WHO
127 TRASH
1,355 PILE
317 INTO
235 AND
3.8 TEN
42.7 WRITER
109 A
324 FROM
1,920 LIVED
211.5 WROTE

PROPORTION WORD PROBLEMS

Answer each question and round your answer to the nearest whole number.

1) If you can buy one can of pineapple chunks for $2 then how many can you buy with $10?

2) One jar of crushed ginger costs $2. How many jars can you buy for $4?

3) One cantaloupe costs $2. How many cantaloupes can you buy for $6?

4) One package of blueberries costs $3. How many packages of blueberries can you buy for $9?

5) Shawna reduced the size of a rectangle to a height of 2 in. What is the new width if it was originally 24 in wide and 12 in tall?

6) Ming was planning a trip to Western Samoa. Before going, she did some research and learned that the exchange rate is 6 Tala for $2. How many Tala would she get if she exchanged $6?

7) Jasmine bought 32 kiwi fruit for $16. How many kiwi can Lisa buy if she has $4?

8) If you can buy four bulbs of elephant garlic for $8 then how many can you buy with $32?

9) One bunch of seedlees black grapes costs $2. How many bunches can you buy for $20?

10) The money used in Jordan is called the Dinar. The exchange rate is $3 to 2 Dinars. Find how many dollars you would receive if you exchanged 22 Dinars.

11) Gabriella bought three cantaloupes for $7. How many cantaloupes can Shayna buy if she has $21?

12) Jenny was planning a trip to the United Arab Emirates. Before going, she did some research and learned that the exchange rate is 4 Dirhams for every $1. How many Dirhams would she get if she exchanged $5?

13) Castel bought four bunches of fennel for $9. How many bunches of fennel can Mofor buy if he has $18?

14) If you can buy one fruit basket for $30 then how many can you buy with $60?

Answer each question. Round your answer to the nearest tenth. Round dollar amounts to the nearest cent.

15) Asanji took a trip to Mexico. Upon leaving he decided to convert all of his Pesos back into dollars. How many dollars did he receive if he exchanged 42.7 Pesos at a rate of $5.30 = 11.1 Pesos?

16) The currency in Argentina is the Peso. The exchange rate is approximately $3 = 1 Peso. At this rate, how many Pesos would you get if you exchanged $121.10?

17) Mary reduced the size of a painting to a width of 3.3 in. What is the new height if it was originally 32.5 in tall and 42.9 in wide?

18) Molly bought two heads of cabbage for $1.80. How many heads of cabbage can Willie buy if he has $28.80?

STUDY GUIDE

Ratios—remember, they MUST BE SIMPLIFIED!

1. Using the shapes above, create a part-to-part ratio. Write it with numbers and words.

2. Using the shapes above, create a part-to-whole ratio. Write it with numbers and words.

3. If the ratio of boys to girls is 3:2 and there are 25 students in a class, make equal ratios to show how many students in the class are boys and how many are girls.

4. If 4 out of every 9 jelly beans is orange and the package contains 108 jelly beans, how many are orange? Make equal ratios to solve this.

Rates/Unit Rates/Proportional Reasoning

5. What is the unit rate if it takes 4 minutes to eat 8 slugs? (# slugs per minute)

6. Which is the better buy—3 videos for $40.00 or 5 videos for $68?

7. In a waffles recipe, it takes 2 eggs for every 24 waffles. If you need to make 60 waffles for a big party, how many eggs will it take? Make equal ratios to solve this problem. It might help to first find a unit rate.

8. It takes Munchy Marvin 3 days to eat a box of cereal. How many boxes of cereal will he eat in 12 days? Make equal ratios to solve this problem.

Proportions

In questions 9 and 10 use the tables to pull ratios and determine if the sets are proportional to each other. Explain how you used your table ratios to get your conclusion.

9.

1st #	**2**	**3**	**5**	**8**	**12**
2nd #	**1**	**1.5**	**2.5**	**4**	**6**

Proportional? Explain:

10.

1st #	**0**	**3**	**4**	**8**	**12**
2nd #	**2**	**5**	**6**	**10**	**14**

Proportional? Explain:

In the next set of ratios, determine if they are proportional using what you know about equivalent ratios

11. $\frac{10}{12}$ and $\frac{20}{32}$

12. $\frac{6}{10}$ and $\frac{9}{15}$

13. $\frac{110}{120}$ and $\frac{22}{24}$

Determine if the ratios below are proportional by cross multiplying.

14. $\frac{200}{120}$ and $\frac{20}{30}$

15. $\frac{4.6}{3}$ and $\frac{23}{15}$

The following set of ratios are proportional. Find the value of the variable.

16. $\frac{7}{20} = \frac{x}{10}$

17. $\frac{6}{18} = \frac{18}{x}$

18. 3.2 : 8 and x : 32

The next set of ratios are proportional. Find the value of the variable.

19. $\dfrac{6\frac{1}{2}}{x} = \dfrac{9}{22\frac{1}{2}}$

20. $\dfrac{30}{25} = \dfrac{d}{32}$

21. $\dfrac{75}{25} = \dfrac{m}{60}$

22. Fill in all missing values in the ratio table below. Hint: First find the math relationship!

x	2	6		30		65
y		12	20		80	