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Unit 7.2, Lesson 1: Notes

Name Ishaan

My Notes

Example:

8:6 is equivalent to 4:3 because

8 : 6 ÷2 → 4 : 3 ÷2

÷2 • 1/2

÷2 • 1/2

1. What are **equivalent ratios**? Give an example.

Two ratios are equivalent if you can multiply each of the numbers in the first ratio by the same factor to get the numbers in the second ratio.

2. Brielle mixed 8 cups of blue paint with 6 cups of yellow paint. Complete the table so that each new mixture will match her original paint color.

Blue Cups	Yellow Cups
8 (÷2)	6 (÷2)
4 (×2, ×3)	3 (×3, ×2)
12	9
16	12

3. Will a mixture with 16 cups of blue paint and 14 cups of yellow paint match the original paint color? Explain your thinking. No because you need 12 cups of yellow with cups of blue to be equal.

Summary

You multiply or divide by the same factor to get equal ratios

- [x] I know that two paint mixtures will look the same if the ingredients are in equivalent ratios.
- [x] I can use equivalent ratios to generate the same color paints.

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Unit 7.2, Lesson 2: Notes

Name Isham

My Notes

X · ___ = y

1. What does it mean for two quantities to be in a **proportional relationship**? In a proportional relationship, the values for one quantity are each multiplied by the same number to get the values for the other quantity

2. Complete the tables so that one table shows a proportional relationship and the other does not.

Proportional Relationship			Not a Proportional Relationship	
x		y	x	y
2	×4 →	8	2	8
6	×4 →	24	6	19
1	×4 →	4	65	4

you can check for a proportional relationship by multiplying or dividing down or across

3. Show (or explain) how you know that the table on the left represents a proportional relationship.

we multiplied all numbers in the first column by the same factor to get to the second column

Summary

. Multiply or divide either down or across to check for a proportional relationship

- [x] I can identify patterns in tables that represent proportional relationships.
- [ ] I can use a table to calculate unknown quantities in a proportional relationship.

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Unit 7.2, Lesson 3: Notes

Name Isham

My Notes

x · ___ = y (___ = COP)

1. What is a **constant of proportionality**? Give an example.

The number you multiply by to get the second column of values "The Multiplier/Factor"

2. An 8-ounce glass of apple juice contains 26 grams of sugar. Complete the table to determine the amount of sugar in different sizes of apple juice.

Apple Juice		
	Volume (oz.)	Sugar (grams)
Glass	8	26
Bottle	12	39
Carton	32	104
Jug	128	416

COP $= \frac{26}{8} = 3.25 = 3\frac{1}{4}$

3. What is the constant of proportionality in this relationship? What does it tell us about the situation?

what does the COP mean?

$3\frac{1}{4}$ grams of sugar per 1 oz of juice

COP: 2nd column heading per 1st column heading

Summary

- The COP is the number we multiply the first column by to get the second column.

- [x] I can determine the constant of proportionality from a table and explain what it means.
- [x] I can use the constant of proportionality to calculate unknown information in a table.
- [x] I can justify whether a table represents a proportional relationship or not.

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Unit 7.2, Lesson 3: Sugary Drinks Name(s) _____

Activity 1: Orange Juice

1. A 12-ounce bottle of orange juice contains 33 grams of sugar. Complete the table to determine the amount of sugar in different sizes of orange juice.

Orange Juice		
	Volume (oz.)	Sugar (grams)
Glass	8	22
Bottle	12	33
Carton	32	88
Jug	128	352

2. What is the constant of proportionality in this relationship?

C.H.

COP $= \frac{33}{12} = 2.75 = 2\frac{3}{4}$

3. What does the constant of proportionality tell us in this situation?

2.75 grams of sugar per 2nd C.H. per 1 oz of juice per 1st C.H.

4. If a person wanted to consume exactly 50 grams of sugar from orange juice, how many ounces would they need to drink?

$\frac{50}{2.75} =$ 18.2 oz

Activity 2: Other Sugary Drinks

1. Here is some information about three new beverages. Complete the tables.

Apple Cider		
	Volume (oz.)	Sugar (grams)
Plastic Bottle	8.5	10.54
Large Cup	10	12.4
Glass Bottle	25	31

COP = 1.24

Carbonated Soda		
	Volume (oz.)	Sugar (grams)
Can	12	46.2
Personal Bottle	20	77
Large Bottle	68	261.8

COP = 3.85

Energy Drink		
	Volume (oz.)	Sugar (grams)
Mini Can	5	16.875
Regular Can	8	27
Jumbo Can	12	40.5

COP = 3.375

2. Which drink is the most sugary? Explain your thinking.

Carbonated soda because it has the most sugar per oz.

3. Is the relationship between a beverage's volume and its grams of sugar always proportional?

Explain your thinking.

Yes, if they use the same recipe. Because it will have a consistent cop.

4. This table shows the weight and the amount of sugar of four different candies.

	Weight (grams)	Sugar (grams)
Candy A	48	30
Candy B	44	28
Candy C	57	31
Candy D	52	33

Is this relationship proportional? No

If yes, what is the constant of proportionality?
If no, explain why it is not proportional.

- The cop is different for all different candies
- The sugar per weight is different for all candies

cop = sugar / weight

Are You Ready for More?

Arjun's goal for this week is to drink no more than 100 grams of sugar from all of his beverages combined. The first table shows Arjun's plan for this week. Try to make a **different** plan to get close to 100 grams of sugar without going over.

Arjun's Planned Beverages	Sugar (grams)
A bottle of orange juice	33
Half a can of carbonated soda	23.1
A regular can of energy drink	27
4 ounces of apple cider	4.96
3 ounces of carbonated soda	11.55
Total:	99.61

Your Planned Beverages	Sugar (grams)
Total:	

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Unit 7.2, Lesson 3: Sugary Drinks Name(s) _____

Lesson Synthesis

Here are instructions for cooking instant rice in the microwave:

Ingredients

Rice (cups)	1	2	3
Water (cups)	$1\frac{1}{2}$	3	$4\frac{1}{2}$

Cook Time

Rice (cups)	1	2	3
Time (min.)	7	11	15

1. Which relationships are proportional (if any)?

2. For any proportional relationships, determine the constant of proportionality and explain what it means.

Cool-Down

When you mix two colors of paint in equivalent ratios, the resulting color is always the same. Each row of the table represents a way to make the same shade of green paint.

Cups of Blue Paint	Cups of Yellow Paint
2	10
1	5
6	30
52	260

1. What is the constant of proportionality in this relationship?

2. What does the constant of proportionality mean in this problem?

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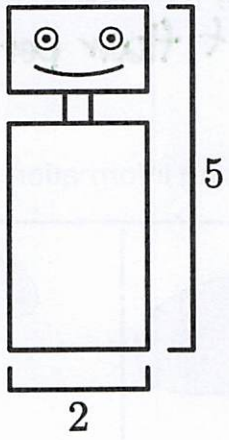
Unit 7.2, Lesson 4: Notes Name _____

My Notes

The table shows information about three robots. The relationship between width and height is proportional.



1. Complete the table.

Robot Width in Inches (w)	Robot Height in Inches (h)
2	5
6	15.0
11	27.5

COP = $\frac{5}{2}$ = 2.5

2 • 2.5 = 5

6 • 2.5 = 15.0

11 • 2.5 = 27.5

COP/k value

2. Write instructions explaining how to calculate the height of the robot given any robot width.

width • 2.5 = height

COP/k value

3. Write an equation that relates the robot height, h, to the robot width, w.

2nd variable $y = kx$ 1st variable

COP

$h = 2.5w$

Summary

- Second variable = COP · first variable

$y = k \cdot x$

$y = kx$

Invisible multiplication symbol

- [x] I can explain where to find the constant of proportionality as a value in a table.
- [x] I can write equations to represent proportional relationships.

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Unit 7.2, Lesson 5: Notes Name _____

My Notes

A bakery uses the equation $f = 1.5h$ to decide how many tablespoons of honey, h, to add to f cups of flour for bread.

1. What does the 1.5 mean in this situation?

   1.5 cups of flour per tablespoon of honey

2. Fill in the missing information for each bread recipe.

		
Honey: 14 tbsp.	Honey: 5 tbsp.	Honey: 12 tbsp.
Flour: 21 cups	Flour: 7.5 cups	Flour: 18 cups

3. A truck is traveling at a constant speed. Its distance, d, in miles after t hours is represented by the equation $d = 45t$.

   How long does it take the truck to travel 18 miles?

h = tbsp honey
f = caps flour = 1.5h
this comes first when you write your description

18 = 1.5h

d = distance
r = rate
t = time

d = rt
$\frac{18}{45} = \frac{45t}{45}$
0.4 = t hour

Summary

- Whatever variable comes first in the equation tells you what comes first when you "describe the situation"

- ☑ I can connect each part of an equation of the form $y = kx$ to the situation it represents.
- ☑ I can use an equation to solve problems involving a proportional relationship.

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Unit 7.2, Lesson 6: Notes

Name _____

My Notes

It took Jayden 6 minutes to fill a bathtub with 24 gallons of water from a faucet that was flowing at a steady rate.

Time in Minutes (t)	Gallons of Water (w)
0	0
2	8
4	16
6	24

1. What are the two constants of proportionality for this situation?

   4, $\frac{1}{4}$

   How are they related?

   They are reciprocals

2. What does each constant of proportionality tell you about this situation?

   4 → tells us that 4 gallons of water are added to the tub each minute.

   $\frac{1}{4}$ → tells us it take $\frac{1}{4}$ minute to fill 1 gallon of water

3. Write two equations that relate w and t in this situation.

   $w = 4t$

   $t = \frac{1}{4}w$

solving for W

solving for T

Summary

- To get the second column in the table, multiply by the C.O.P.
- To get the first column in the table, multiply by the RECIPROCAL of the C.O.P.

- [x] I can explain what *reciprocal* means and how it is related to constants of proportionality.
- [x] I can write two equations for the same proportional relationship.

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Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner A)

It took Jayden 5 minutes to fill a cooler with 8 gallons of water from a faucet that was flowing at a steady rate. Complete the table using this fact.

Time in Minutes (t)	Gallons of Water (w)
0	0
1	1.6
2.5	4
5	8
t	$\frac{8}{5}t$

1. What is the constant of proportionality?

$\frac{8 \text{ gallons}}{5 \text{ minute}} = \frac{8}{5}$

2. Write an equation for the proportional relationship.

$w = \frac{8}{5}t$

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Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner B)

It took Jayden 5 minutes to fill a cooler with 8 gallons of water from a faucet that was flowing at a steady rate. Complete the table using this fact.

Gallons of Water (w)	Time in Minutes (t)
0	0
1	$\frac{5}{8}$
4	2.5
8	5
w	$\frac{5}{8}w$

1. What is the constant of proportionality?

$\frac{5 \text{ minutes}}{8 \text{ gallons}} = \frac{5}{8}$

2. Write an equation for the proportional relationship.

$t = \frac{5}{8}w$

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Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner A)

3. What is the relationship between the constants of proportionality that you and your partner found?

$\frac{8}{5}$ and $\frac{5}{8}$ They are reciprocals

4. What does $\frac{5}{8}$ tell you about the situation?

$t = \frac{5}{8}w$

- it takes 5 minutes to fill 8 gallons of water
- It takes $\frac{5}{8}$ of a minute to fill one gallon of water

5. What does $\frac{8}{5}$ tell you about the situation?

$w = \frac{8}{5}t$

- $\frac{8}{5}$ of a gallon of water fills every one minute

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Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner B)

3. What is the relationship between the constants of proportionality that you and your partner found?

4. What does $\frac{5}{8}$ tell you about the situation?

5. What does $\frac{8}{5}$ tell you about the situation?

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Unit 7.2, Lesson 6: Two and Two Name _____

Lesson Synthesis

Some of the proportional relationships that we examined in this lesson are represented below.

Situation	There are 100 centimeters, y, in every meter, x.	It took Jayden 5 minutes, t, to fill a cooler with 8 gallons of water, w, at a steady rate.
Constants of Proportionality	$100, \frac{1}{100}$	$\frac{5}{8}, \frac{8}{5}$
Equations	$y = 100x$, $x = \frac{1}{100}y$	$w = \frac{8}{5}t$, $t = \frac{5}{8}w$

1. In each situation, what is the relationship between the two constants of proportionality?

They are reciprocals

2. In each situation, what is the relationship between the two equations?

The C.O.P.s are reciprocals and the variables are switched

Cool-Down

An albatross is a large bird that can fly 400 kilometers in 8 hours at a constant speed.

1. What are two constants of proportionality for the relationship between distance in kilometers, d, and number of hours, t?

50, $\frac{1}{50}$

2. Write two equations that relate d and t in this situation.

$t = \frac{1}{50}d$

$d = 50t$

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Unit 7.2, Lesson 7: Notes Name _____

My Notes

x	y
0	3
2	7
12	27
3.5	10

1. Use the equation $y = 2x + 3$ to complete the table.
2. Does the equation represent a proportional relationship?

   Explain.

   NO, because there is no consistent C.O.P.

$\frac{x}{2} = y$
$y = 2x + 1$
$y = 1.5x$

3. Circle the equations that represent a proportional relationship.
4. How can you tell if an equation represents a proportional relationship?

   I can tell if an equation represents a proportional relationship by seeing its $y = kx$

Summary

- A relationship is proportional if:
  - There is no adding/subtracting, exponent
  - It goes through (0, 0)
  - It has a consistent C.O.P.

☑ I can explain why a relationship is proportional or not by looking at the equation.

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Unit 7.2, Lesson 7: Supplement Name _____

1.a Use the information provided to fill in the missing information.

Story

Lucia earns $12 per hour.

Equation

$y = 12x$

Table

Hours (x)	Pay (y)
0	0
1	12
2.5	30
3	36

Is it proportional?

Yes

Explain how you know.

This is proportional because the column start with 0 and you multiply the x column by 12 to get the y colum

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Unit 7.2, Lesson 7: Supplement Name _____

1.b Use the information provided to fill in the missing information.

Story

The recipe calls for 1 banana for every 2 smoothies.

Equation

$x = 2y$

Table

Smoothies (x)	Bananas (y)
0	0
1	0.5
5	2.5
10	5

Is it proportional?

Yes

Explain how you know.

Because you are multiplying the y column by 2 to get the y.

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Unit 7.2, Lesson 7: Supplement Name _____

2.a Use the information provided to fill in the missing information.

Story

The cell phone costs $500, plus $35 per month for the plan.

Equation

$y = 500 + 35x$

Table

Months (x)	Total Cost (y)
0	500
1	535
3	605
4	640

Is it proportional?

No

Explain how you know.

Because you hav (0,0) as a point.

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Unit 7.2, Lesson 7: Supplement Name _____

2.b Use the information provided to fill in the missing information.

Story

The area of a square is the side length multiplied by itself.

Equation

$y = x^2$

Table

Side Length (x)	Area (y)
0^2	0
1^2	1
10	$\sqrt{100}$
5^2	25

Is it proportional?

NO

Explain how you know.

there is no consistent C.O.P.

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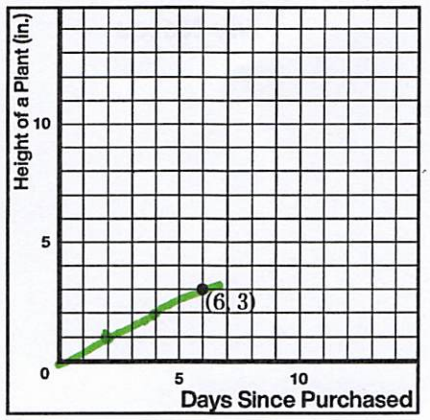
Unit 7.2, Lesson 8: Notes Name Ishan

My Notes

Proportional Graph go through (0,0) & they are straight lines

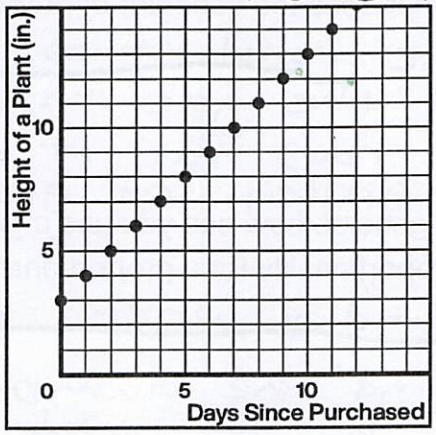
A plant's height is proportional to the number of days since it was purchased. On Day 6, it was 3 inches tall.



1. Add more points to the graph to represent the plant's height on other days.

x	y
0	0
1	1/2
2	1

2. Should the origin, $(0, 0)$, be included in this relationship? Why or why not? Yes. $K \cdot 0 = 0$ so the point (0,0) will always be included in proportional relationships.



3. This graph shows information about a different plant. Does this represent a proportional relationship? Why or why not? No, it doesn't go through the (0,0)

Summary

- you can tell if a graph is proportional if it goes through (0,0) and if it is a straight line.

- [x] I can explain what a proportional relationship looks like when represented with a graph.
- [x] I can justify if a graph represents a proportional relationship or not.

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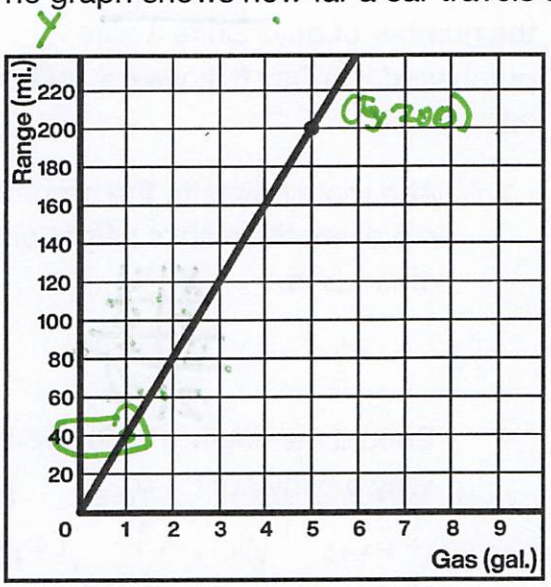
Unit 7.2, Lesson 9: Notes

Name Ishaan

My Notes

The graph shows how far a car travels using any amount of gas.



1. Determine the constant of proportionality for the relationship between gallons of gas and miles.

$COP = \frac{y}{x} = \frac{200}{5} = 40$

x	y
5 · 40 =	200
1	40 ← COP, k

2. What does the constant of proportionality mean in this situation?

The constant of proportionality tells us the gas mileage of the car or how far it can travel using 1 gallon of gas. = 40 mi/gal gas

3. In general, how can you use a graph to find the constant of proportionality for a proportional relationship?

- Find y when x = 1 (1, k) COP
- Find the number you multiply x by to get y. $x \cdot k = y$

$COP, k = \frac{y}{x}$

Summary

COP, k is equal to y using point (x, y). When x = 1, you get the COP, k value.

$\frac{y}{x}$

- ☑ I can interpret points on the graph of a proportional relationship.
- ☑ I can identify the constant of proportionality from a graph of a proportional relationship.