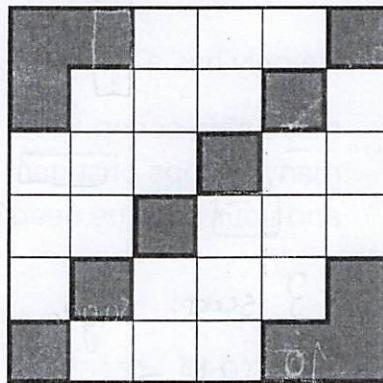


## My Notes

- Percent is out of 100
- To go from a decimal to percent multiply by 100.
- Of means multiply

1. What percent of the square is shaded? Explain how you know.



$$\frac{\text{Part}}{\text{Whole}} \cdot 100 = \text{percent}$$

$$\frac{12}{36} \cdot 100 = 33\%$$

2. Describe a strategy to calculate 15% of 60.

$$\frac{15}{100} \cdot 60 = \frac{900}{100}$$

Convert to a decimal  
by multiplying by the whole

$$= 9 \text{ percent}$$

3. Mariam looked at a diagram and said that 30% was shaded and 40% was not shaded. Explain how you know there must be an error.

$30 + 40 = 70\%$ . Not  $100\%$ .

They don't add up to  $100\%$ .

## Summary

$$\frac{\text{Part}}{\text{Whole}} \cdot 100 = \text{percent}$$

make sure  
all the points  
are same size

I can visualize a percentage on a grid.

I can calculate the percentage of a number.

## My Notes

$$\text{Sugar} : \frac{3}{4} \text{ cup}$$



$$\text{flour} : 2\frac{1}{2} \text{ cup}$$

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	1 cup
$\frac{2}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	1 cup
$\frac{2}{4}$	$\frac{1}{4}$			1 cup

$$20 \cdot \frac{1}{4} \text{ cups}$$

Kwasi is making banana bread.

1. He only has a  $\frac{1}{4}$  cup measuring scoop. How many scoops of sugar and flour does he need?

3 scoops sugar  
10 scoops flour

2. A person Kwasi is planning to share his banana bread with wants to know how much sugar there is per serving in his recipe. What should Kwasi tell them?



3. Kwasi wants to make a larger loaf to serve 10 people. How much of each ingredient will he need?

Serving	Original	Larger Loaf
Bananas	$6 \times \frac{20}{6} = 20$	10
Butter	$2 \times \frac{20}{6} = \frac{20}{3}$	$\frac{10}{3}$
Sugar	$\frac{1}{4}$	$\frac{1}{20}$
Flour	$2\frac{1}{2}$	50
Baking Soda	1	$\frac{10}{6}$

- Use tape diagrams or proportional relationships to scale the recipes

## Summary

I can use the constant of proportionality to solve problems that involve fractions.

**Activity 1: Which Recipe?**

Amara is making peach cobbler. She has three recipes and is deciding which one to make.

Recipe A	Recipe B	Recipe C
<b>Number of Servings: 9</b> <ul style="list-style-type: none"> <li>• <math>2\frac{7}{10}</math> lb. of peaches</li> <li>• <math>\frac{1}{2}</math> cup of butter</li> <li>• 1 cup of flour</li> <li>• <math>1\frac{1}{8}</math> cups of sugar <math>= \frac{9}{8}</math></li> <li>• <math>\frac{1}{2}</math> tsp. of lemon juice</li> </ul>	<b>Number of Servings: 12</b> <ul style="list-style-type: none"> <li>• 4 lb. of peaches</li> <li>• <math>\frac{3}{4}</math> cup of butter</li> <li>• <math>\frac{3}{4}</math> cup of flour</li> <li>• <math>1\frac{1}{3}</math> cups of sugar</li> <li>• <math>\frac{1}{2}</math> tsp. of lemon juice</li> </ul>	<b>Number of Servings: <math>4\frac{1}{2}</math></b> <ul style="list-style-type: none"> <li>• <math>1\frac{4}{5}</math> lb. of peaches</li> <li>• <math>\frac{1}{4}</math> cup of butter</li> <li>• <math>\frac{2}{3}</math> cup of flour</li> <li>• <math>\frac{3}{4}</math> cup of sugar</li> <li>• 1 tsp. of lemon juice</li> </ul>

Amara wants to make a recipe that isn't too sweet.

1. She thinks Recipe C will be the least sweet because it has the least amount of sugar.  
Do you agree? Explain your thinking.

$$\textcircled{A} \quad \frac{9}{8} \div \frac{9}{8} = \frac{9}{8} \times \frac{1}{9} = \frac{1}{8} = \frac{1}{5}$$

$$\textcircled{C} \quad \frac{3}{4} \div 4\frac{1}{2} = \frac{3}{4} \div \frac{9}{2} = \frac{3}{4} \times \frac{2}{9} = \frac{1}{6}$$

2. Which recipe should she make? Explain your thinking.

B, because it is the least

3. Is the relationship between number of servings and total amount of sugar proportional for each recipe? Explain your thinking.

For each individual  
recipe  $\frac{M}{S}$  is proportional

**Activity 2: Adjusting a Recipe**

1. Jamar is making Recipe B for his family. Determine how much of each ingredient he needs for one serving.

Original  
Number of Servings

Recipe B	
<b>Number of Servings:</b> 1	
<u><math>\frac{3}{5}</math></u>	lb. of peaches
<u><math>\frac{2}{26}</math></u>	cup(s) of butter
<u><math>\frac{1}{40}</math></u>	cup(s) of flour
<u><math>\frac{3}{9}</math></u>	cup(s) of sugar
<u><math>\frac{1}{20}</math></u>	tsp. of lemon juice

- 2.1 He wants to make just enough for 3 adults and 3 children. The children will eat less than the adults. How many servings should Jamar make? 4

Use the serving size you chose to adjust Recipe B.

Recipe B	
<b>Number of Servings:</b> 4	
<u><math>\frac{4}{5}</math></u>	lb. of peaches
<u><math>\frac{2}{4}</math></u>	cup(s) of butter
<u><math>\frac{4}{9}</math></u>	cup(s) of flour
<u><math>\frac{4}{9}</math></u>	cup(s) of sugar
<u><math>\frac{4}{5}</math></u>	tsp. of lemon juice

- 2.2 Jamar has a measuring spoon that is  $\frac{1}{8}$  teaspoon. How many spoonfuls of lemon juice does he need to make this recipe?

**Lesson Synthesis**

Mohamed's vegetable soup recipe calls for  $\frac{1}{3}$  of a cup of carrots for every  $\frac{1}{5}$  of a liter of soup.

Haru's soup calls for  $\frac{7}{8}$  of a cup of carrots for every  $\frac{1}{3}$  of a liter of soup.

What are some strategies we can use to show that Haru's soup will have more carrots per liter than Mohamed's soup?

*Divide Recipe by Same size*

*Set up diagram*

**Cool-Down**

Whose lemonade mixture tastes stronger? Explain your thinking.

Aba mixes  $2\frac{1}{2}$  cups of water with  $\frac{1}{3}$  of a cup of lemon juice.

Esteban mixes  $1\frac{2}{3}$  cups of water with  $\frac{1}{4}$  of a cup of lemon juice.

$$\frac{7}{3} \div 2\frac{1}{2}$$

$$\frac{1}{4} \div 1\frac{2}{3}$$

$$\frac{7}{3} \div \frac{5}{2}$$

$$\frac{1}{4} \div \frac{5}{3}$$

## My Notes

In tables  
will be  
Moving  
 $L \rightarrow R \rightarrow X$   
(Multiply)

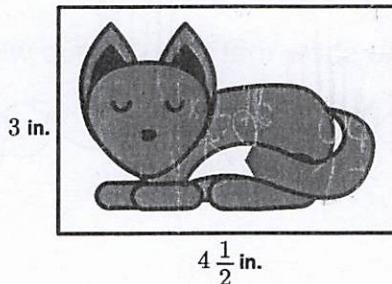
Moving  
 $R \rightarrow L \leftarrow \div$

①  $\frac{5}{2}$  find the C.O.P  
② Move left  $\div$   
or right  $\rightarrow$

StuckStickers makes pins in addition to stickers.

1. Here is Cho's design and thinking for a pin that is  $\frac{3}{4}$  inches wide.

Cho's Design



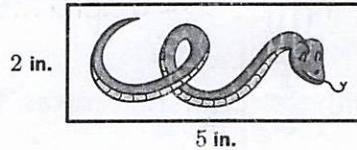
Cho's Thinking

Height (in.)	Width (in.)
3	$\frac{1\frac{1}{2}}{\cancel{1\frac{1}{2}}} \rightarrow 4\frac{1}{2}$
	$\div \frac{1\frac{1}{2}}{\cancel{1\frac{1}{2}}} \leftarrow \frac{3}{4}$

①  
②

Explain how Cho figured out how tall the pins should be.

- ① find the C.O.P by dividing  
② She had to work backwards so she divided to find the original number
2. Hamza wants to create pins with his design as well. Hamza's pins will be  $\frac{4}{5}$  inches tall. What will the width of his pin be?



Height	Width
2	5

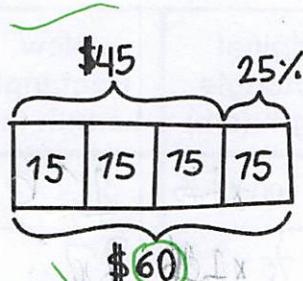
$$\frac{4}{5} \times \frac{5}{2} = \frac{20}{10} = 2$$

- ① Set up a table and put in numbers you know  
② Find the C.O.P  
③ Move left  $\div$  or right  $\rightarrow$  in table  
Do keep, change, cross if dividing.

I can use a table to determine an unknown value in a proportional relationship.

## My Notes

Here are two different representations Pablo used to figure out the new price of a pair of headphones after using a coupon.



TAPE DIAGRAM

OLD	NEW
100%	75%
$\times .75$	
\$60	\$45

$\frac{100\% - 25\%}{75\%}$

TABLE

- What was the original price of the headphones? Circle where you see it in each representation.

\$60

- What is the percent increase or percent decrease? Star where you see it in each representation.

25% decrease

- Choose one representation and explain how Pablo used it to figure out the new price of the headphones.

Pablo used the table to

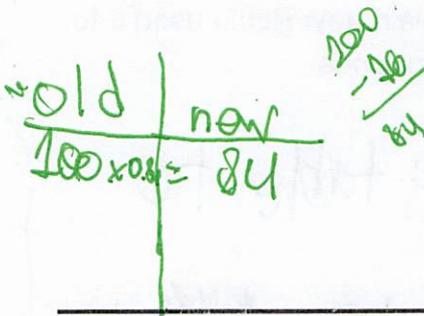
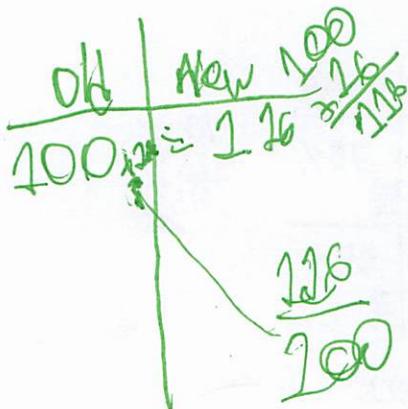
find the new price by ~~mult~~ the decimal version of the original amount.

Pablo used the tape diagram Summary

Always start with 100%.

- I can use tape diagrams and tables to represent adding or subtracting a percentage from 100%.
- I can determine the new amount if I know the original amount and the percent change.

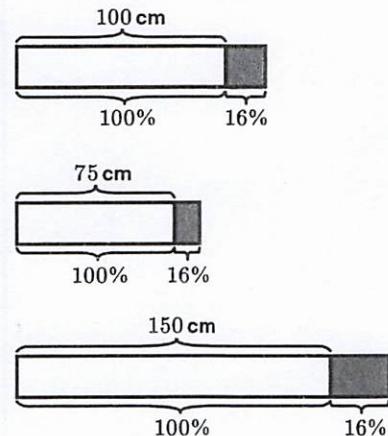
## My Notes



1. Each rectangle is 16% longer than the original. Complete the table with the length of each new rectangle.

Original Rectangle Length (cm)	New Rectangle Length (cm)
100	116
75	87
150	174

$$1.16b = N$$



2. Write at least two different equations that represent the relationship between the length of the original rectangle,  $b$ , and the length of new rectangle,  $c$ .

$$\begin{aligned} c &= 1.16b \\ c &= (1+0.16)b \\ c &= 1b + 0.16b \end{aligned}$$

3. Write at least one equation for the relationship between the length of an original rectangle and the length of a new rectangle that is 16% shorter.

$$\begin{aligned} c &= 0.84b \\ c &= (1-0.16)b \\ c &= 1b - 0.16b \end{aligned}$$

- figure out whether you're adding or subtracting.
- Decide on your variables.
- Calculate how much you're adding or subtracting.
- Write the equation as  $\text{original} \pm \% \text{ original}$

## Summary

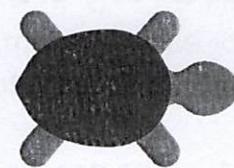
I can write an equation to represent adding or subtracting a percentage from 100%.

## My Notes

At a turtle sanctuary, the number of nesting turtles decreased by 20% compared to last year.

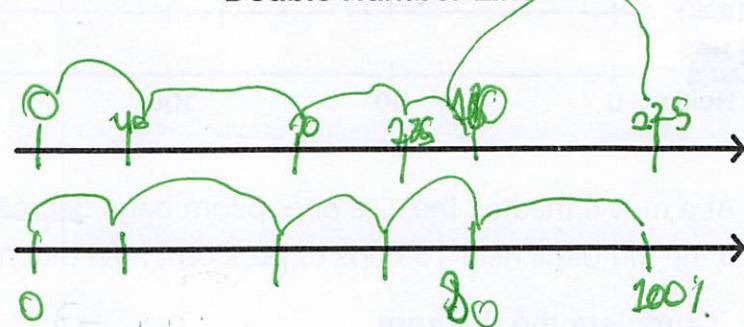
This year, there are 180 nesting turtles.

$$\begin{array}{r} 100 \\ - 20 \\ \hline 80 \end{array}$$



1. Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line



$$\begin{array}{r} 100 \\ - 20 \\ \hline 80 \end{array}$$

Table	
Old	new
$100 \times 0.8$	80
$225 = 0.8 \div 180$	

Equation

$$\begin{aligned} 180 &= 80\% \cdot x \\ 180 &= \frac{80}{100} \cdot x \\ 225 &= \frac{100}{80} \cdot x \\ 225 &= \frac{0.8}{x} \end{aligned}$$

2. How many nesting turtles were at the sanctuary last year?

225

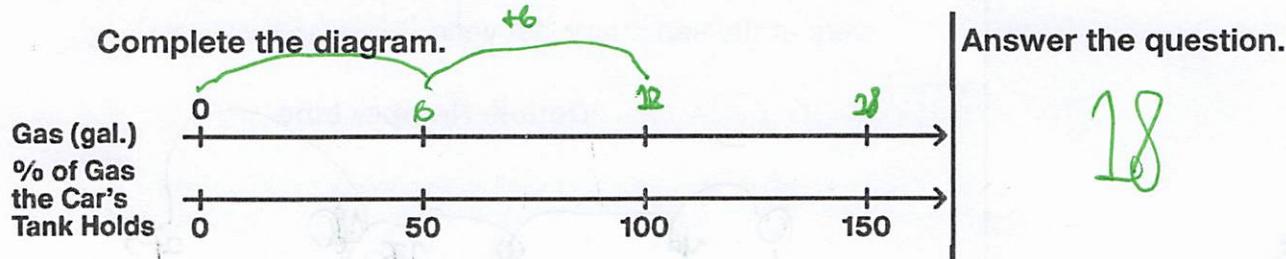
1. Add info you know to the Summary
2. Decide on a ~~number line~~ benchmark percent to use.
3. Multiply or divide to get the percent you want

- I can use double number lines to represent adding or subtracting a percentage from 100%.
- I can determine the original amount if I know the new amount and the percent change.

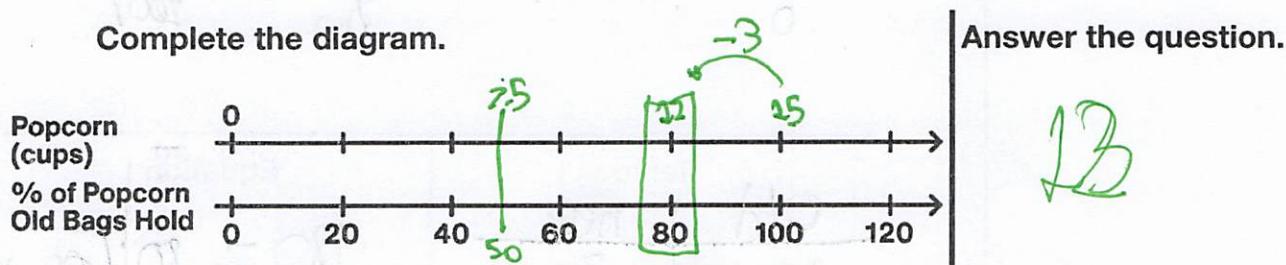
**Activity 1: Double Number Lines**

For each problem, fill in missing values on the double number line diagram to show the percentages that correspond to the original amount and to the new amount. Then answer the question.

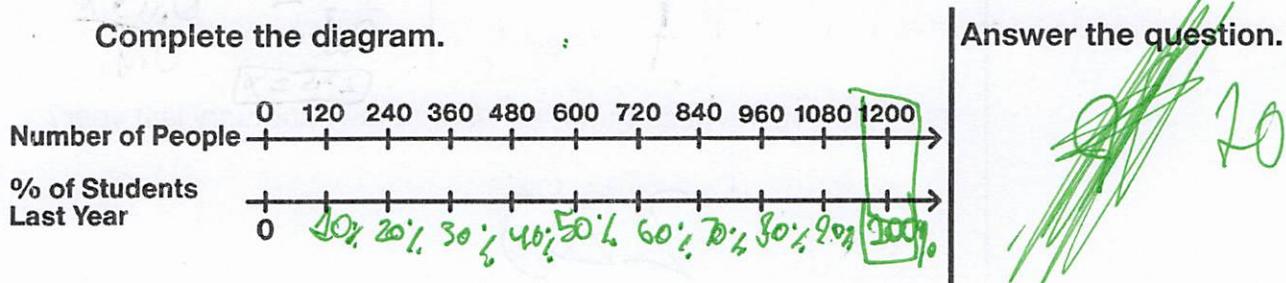
1. The gas tank in a car holds 12 gallons. The gas tank in a truck holds 50% more.  
How much gas does the truck's tank hold?



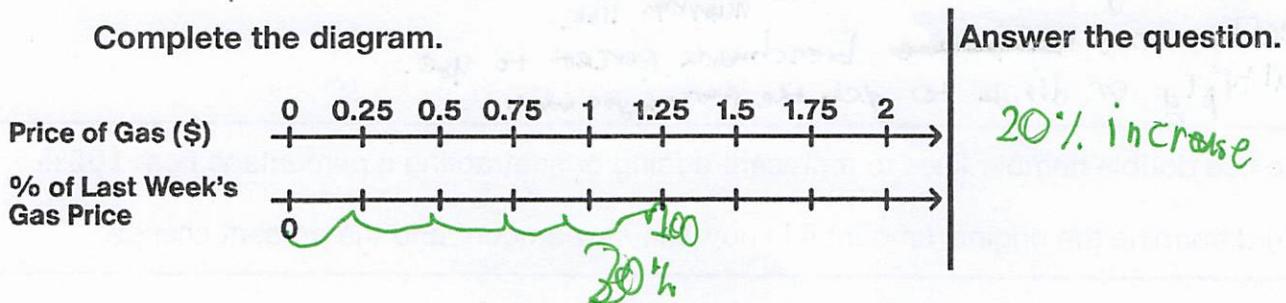
2. At a movie theater, the size of popcorn bags decreased by 20%.  
If the old bags held 15 cups of popcorn, how much do the new bags hold?



3. A school had 1 200 students last year and only 1 080 students this year.  
What was the percent decrease in the number of students?

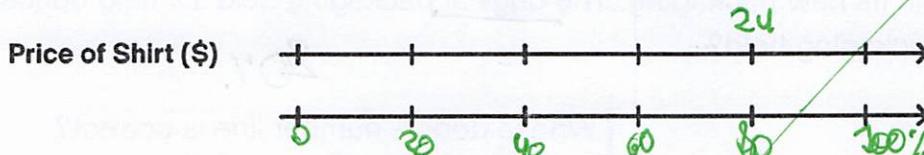


4. Last week, gas was \$1.25 per gallon. This week, gas was \$1.50 per gallon.  
By what percent did the price increase?



5. After a 20% discount, the price of a T-shirt is \$24. What was the price before the discount? *at 100%*

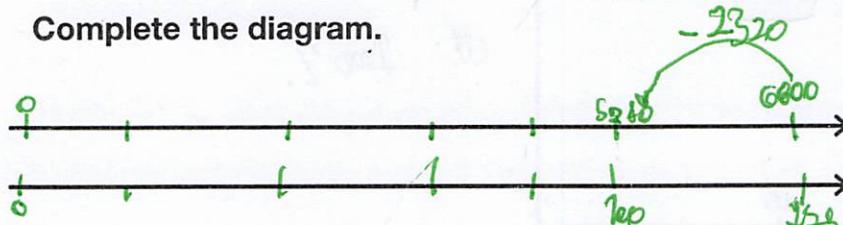
Complete the diagram.



Answer the question.

6. The population of Boom Town has increased 25% since last year. The population is now 6 600. What was the population last year?

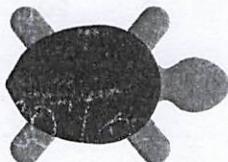
Complete the diagram.



Answer the question.

## Activity 2: Green Sea Turtles

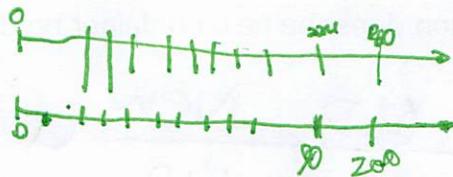
Some beaches where green sea turtles come ashore to lay eggs have been made protected sanctuaries so the eggs will not be disturbed.



This year, there were 234 nesting turtles at a sanctuary. That number is a 10% decrease compared to last year. *3200%*

Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line



Table

old	new
100 · 0.9	90
260 · 0.9	234

Equation

$$\begin{aligned} 234 &= 8\% \text{ of } x \\ \frac{234}{0.9} &\approx 0.9 \end{aligned}$$

How many nesting turtles were at the sanctuary last year?

0.9

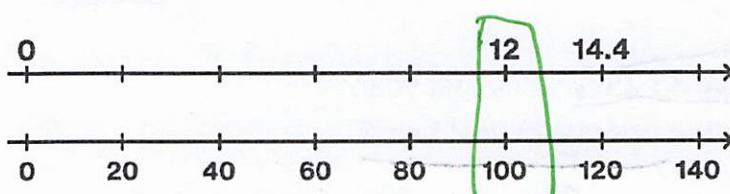
**Lesson Synthesis**

Abdullah and Kanna are working on the same problem:

A juice box has 20% more juice in its new packaging. The original packaging held 12 fluid ounces. How much juice does the new packaging hold?

20%.

**Abdullah's double number line:**



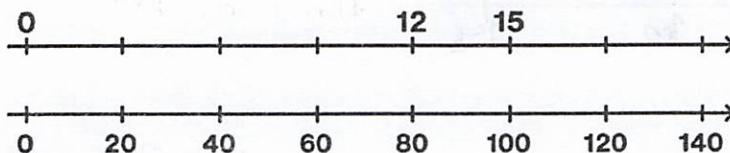
Whose double number line is correct?

Abdullah

Explain or show your reasoning.

He put 12 oz  
at 200%.

**Kanna's double number line:**

**Cool-Down**

A company claims that their new bottle holds 40% more laundry soap.

If their original container held 53 fluid ounces of soap, how much does the new container hold?

~~$$\begin{array}{r} \cancel{53} \\ + \cancel{53} \cdot 0.4 \\ \hline \cancel{22.2} \end{array}$$~~

$$\begin{array}{r}
 53 \\
 + 22.2 \\
 \hline
 75.2
 \end{array}$$

<u>OLD</u>	<u>NEW</u>
$53 \times 1.40$	140
$53 \times 1.40 = 74.2$	

## My Notes

\* If you're given the percent, use a Old/New table

\* the old or original % is always 100

If asked for percent increase or decrease use

$$\frac{\text{new} - \text{old}}{\text{old}} \times 100$$

- tells as decrease

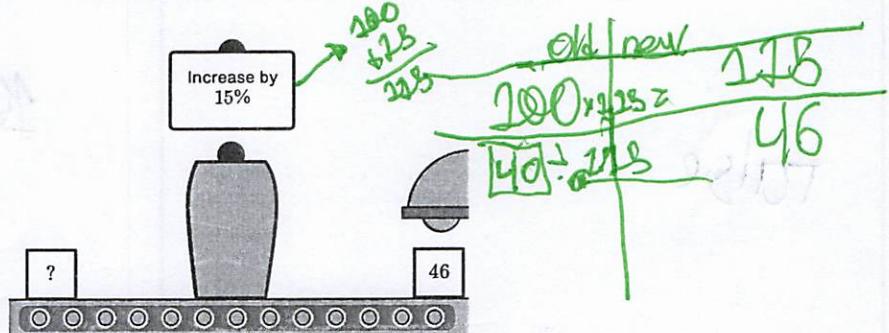
+ tells as increase

~~Ex. increased by 20% = 30 down by 20% = 15 NOT 20~~

• set up an the C.O.P

1. A number went into this machine and 46 came out.

What number went in? Explain your strategy.



2. 50 went into a different machine and 46.5 came out. What percent increase or decrease did this machine use?

$$\frac{46.5 - 50}{50} \cdot 100 = \frac{-3.5}{50} \times 100 = -7\%$$

decrease

3. What are some important things to remember about figuring out the original value given the new value and a percent increase or decrease?

② If given the % use an Old/New table.

③ Having an increase of 20% is not the same as decreasing by 20%.

④ To work backwards in the table, divide by the C.O.P.

Old/New Summary table and find

- I can determine the original amount if I know the new amount and the percent change for one-step and multistep problems.

# desmos

## Unit 7.4, Lesson 8: Notes

Name Ishan

### My Notes

To convert from

- % to decimal, move a decimal two places to the left.



$$\text{Ex. } 0.7\% = 0.007$$

$$\text{Ex. } 18\% = 0.18$$

1. What are sales tax and tip?

Sales tax - fee paid to the government, different for each city / county

Tip - amount you add to a bill to pay the waiter, usually between 10% to 20%.

2. Use this receipt to figure out the total amount this customer paid for their \$20 meal after an 18% off coupon and 7.5% sales tax.

Original Cost	\$20.00
-0.18 × 20	= -3.60
18% Off Coupon	\$ 16.40
+ 0.075 × 16.40	= +1.23
	\$ 17.63
Total	\$? ??
	\$17.63

3. Which would result in the greatest total amount?

- Tax first, then coupon.
- Coupon first, then tax.
- They are the same.
- Not enough information.

Explain your thinking.

$$\begin{aligned} \text{Original cost} &= 20.00 \\ \text{Tax } 10\% &= 0.1 \cdot 20 = +2.00 \\ &\underline{22.00} \end{aligned}$$

$$\begin{aligned} \text{Coupon } 20\% &= -4.00 \\ 20.00 - 4.00 &= 16.00 \\ &\underline{16.00} \end{aligned}$$

$$\begin{aligned} \text{Original cost} &= 20.00 \\ \text{Coupon } 20\% &= -4.00 \\ 20.00 - 4.00 &= 16.00 \\ \text{Tax } 10\% &= 0.1 \cdot 16 = +1.60 \\ &\underline{17.60} \end{aligned}$$

- Sales tax is added
- Coupons are subtracted

### Summary

- I can solve multistep problems about sales tax and tip.

# desmos

## Unit 7.4, Lesson 9: Notes

Name \_\_\_\_\_

### My Notes

$$\text{Pay} = \text{Wage} + \text{Tips}$$

$$15\% = 0.15$$

Adrian is a 25-year-old who plays in a band and works 30 hours per week as a server. He makes minimum wage, which is \$5.45 per hour in his town. Adrian also collects tips. The average tip he receives is 15% of the bill. The typical bill is \$25 per table, and he serves 70 tables in an average week.

1. How much money does Adrian make in a typical week?

$$\text{Wage} = 5.45 \times 30 = 163.50$$

$$\text{Tips} = 0.15 \times 25 \times 70 = 262.50$$

$$\text{Total} = 426.00$$

Imagine that the average tip Adrian receives is 20% instead of 15%.

- 2.1 How much money would he make now?

$$\text{Wage} = 163.50$$

$$\text{Tips} = 0.20 \times 25 \times 70 = 350.00$$

$$\text{Total} = 513.50$$

- 2.2 By what percent would his pay increase?

$$\% \text{ Change} = \frac{\text{Final} - \text{Initial}}{\text{Initial}} \times 100$$
$$\text{Initial} = 513.50 - 426.00 \times 100$$
$$=$$
$$= \frac{87.5}{426.00} \times 100$$
$$= 20.5\%$$

$$1. \text{ Pay} = \text{Wage} + \text{Tips}$$

$$= \text{Hourly} \cdot \text{Hours} + \text{TIP Rate} \cdot \text{Bill} \cdot \text{Quantity}$$

Wage

$$\boxed{\text{Ex. } 5.45 \cdot 30 + 0.15 \cdot 25 \cdot 70}$$

Summary  
→ decimal

$$2. \% \text{ Change} = \frac{\text{Final} - \text{Initial}}{\text{Initial}} \times 100$$

I can use proportional relationships and percent change to analyze an issue in society.

**Activity 1: Waiting Tables**

Here is information about four servers who work at different restaurants: Laila, Tiana, Peter, and Julian. Select one of these people below. Make sure each group member selects a different person.

<input type="checkbox"/> <b>Laila</b> is 35 years old. She is married and has two children. She has worked at the same restaurant for 7 years. She works 40 hours per week and makes \$2.13 per hour. In a typical week, she serves 75 tables. The average bill at the restaurant is \$41 per table, and she typically receives an 18% tip.	<input type="checkbox"/> <b>Tiana</b> is 25 years old. She lives with a roommate and a dog. She has worked at a fancy restaurant for 6 months. She works 40 hours per week and makes \$2.13 per hour. She usually serves 45 tables per week. The average bill at the restaurant is \$130 per table, and she typically receives a 20% tip.
<input checked="" type="checkbox"/> <b>Julian</b> is 29 years old. He lives in Virginia with his 3-year-old son. He just finished his third year as a server. He works 40 hours per week and makes \$2.13 per hour. In a typical week, he serves 95 tables. The average bill at the restaurant is \$22 per table, and he typically receives a 15% tip.	<input type="checkbox"/> <b>Peter</b> is 19 years old. He lives at home with his parents and goes to college part-time. He recently started as a server, working 40 hours per week. Where Peter lives, the minimum wage for tipped and non-tipped employees is \$7.25 per hour. In the average week, he serves 90 tables whose typical bill is \$21 with an average tip of 15%.

With the support of your group, answer the questions below for the person(s) you selected.

- How much money does your person make in a typical week?

$$(\$2.13 \cdot 40) + (0.15 \cdot 22 \cdot 95) = \$398.70$$

- Suppose people at the restaurant increase their tipping percentage by 5 percentage points (for example, 18% becomes 23%).

How much would your person make now?

$$(\$2.13 \cdot 40) + (0.20 \cdot 22 \cdot 95) = \$403.10$$

By what percent would their pay increase?

$$\approx 26\%$$

- Discuss the following with your group:

- Which of the four people makes the most money?
- Whose pay increases by the highest percentage when the tips increase by 5%?
- Do you think the way we pay servers in these examples is fair? Why or why not?

## Activity 2: What's Fair?

1. Some restaurants have experimented with a different approach to paying servers. One approach is that servers would make \$15 per hour, but are not allowed to accept tips.  
Which of the four people do you think would be happy with this approach? Why?

$$15 \times 40 = \$600$$

Jillian would be happier and so would Peter because they would make more money. ✓

2. Consider these three approaches to paying servers that we have seen so far:

- A. Servers get paid \$2.13 per hour, plus tips.
- B. Servers get paid \$7.25 per hour, plus tips.
- C. Servers get paid \$15 per hour, with no tips.

Invent and describe a system to determine a server's pay that you think is fairer than the ones above. Calculate what each of the four people would earn under your system.

\$20 / Hour + 20% Tips

$$20 \times 40 + 0.20 \times 22.95 \text{ or } (20 \times 40) + (0.25 \times 20.25) = ?$$

## Are You Ready for More?

Danny Meyer owns 15 restaurants in New York City. In 2015, he announced that tipping would be eliminated at his restaurants, while the price of menu items would increase by 20%. Using a search engine, find and read at least one article about this (for instance, search "Danny Meyer tipping").

After reading, answer this question on a separate sheet of paper: *If you owned a restaurant, would you ban tipping? Why or why not?*

## Lesson Synthesis

Describe how you can determine how much a restaurant server makes in a week.

Be as specific as you can.

Get the dollar per hour then the hours.

minimum wage + tips = total wage

$$\text{Wage} \rightarrow \$10.1 + \$15.00$$

\\$10.10

Hourly rate + tips = total wage

different ways to calculate

apply minimum wage

$$\$10.10 \times 8 = \$80.80$$

then add tips

## Cool-Down

Tariq works as a server making \$9 per hour. In a typical 8-hour shift, he earns \$65 in tips.

The restaurant offers Tariq a 50% raise on his hourly rate. If he takes the offer, he would have to stop collecting tips.

If you were Tariq, would you accept this offer? Why or why not.

$$\begin{array}{r} 42 \\ \times 2 \\ \hline 134 \end{array}$$

X Yes. Because he cooks more  
by \$10.

## My Notes

$\% \text{ change} =$

$$\frac{\cancel{\text{New}} - \cancel{\text{Old}}}{\cancel{\text{Old}}} \times 100$$

Ex. 5% increase

$$\rightarrow 100 + 5 = 105$$

$$y = 1.05x$$

→

Between 2017 and 2018, the city of San Francisco raised its minimum wage from \$14.00 to \$15.00.

- 1.1 What is the percent increase?

$$\frac{15 - 14}{14} \times 100 = 7.14 \%$$

- 1.2 Write an equation for the relationship between the minimum wage in 2017,  $x$ , and the minimum wage in 2018,  $y$ .

$$100 + 7.14 = 107.14 \rightarrow 107.14$$

$$y = 1.0714x$$

- 1.3 If the percent increase stayed constant, how much should minimum wage be in San Francisco in 2020?

Show or explain your thinking.

Year	Minimum Wage
2018	14 $\times 1.0714$
2019	14.07 $\times 1.0714$
2020	14.72 $\times 1.0714$

2. Explain to a family member how the cost of college has changed over time compared to minimum wage. What is important for them to know?

- The cost of college has significantly increased.
- The cost of college is now more than a person making minimum wage can afford.

• Substitute values into the equation to get the new amount.

## Summary

I can write equations to represent the cost of college over time.

I can solve problems about the cost of college over time.

**Activity 1: Minimum Wage vs. Cost of College**

This table shows the federal minimum wage and cost of college over several years.

Year	Minimum Wage	Cost of College*
old 1990	\$3.80	\$2 900
2000	\$5.15	\$5 200
2010	\$7.25	\$9 100
new 2017	\$7.25	\$12 200

$$\frac{\text{new} - \text{old}}{\text{old}} \times 100$$

1. Circle two years in the table. By what percent did the minimum wage increase between those two years? The cost of college?

minimum wage

$$\frac{7.25 - 3.80}{3.80} \times 100 = 90.8\% \uparrow$$

$$\frac{\text{cost. of college}}{2,900} \times 100$$

$$= 320.1\%$$

2. Generally, have the minimum wage and the cost of college increased at the same rate? Is this fair? Explain your thinking.

NO, they did not increase at the same rate. It is not fair because it's made it so people can't afford to go to college.

3. A typical work week is 40 hours. If you worked a minimum wage job in 1990, how many weeks did you have to work in order to pay for college? In 2017?

$$\text{Pw} = \text{Hourly wage} \cdot \text{Hours} \quad \text{vs. Cost of College}$$

$$1990: 3.80 \cdot 40 = \$152/\text{wk} \quad \text{vs. } 2,900$$

$$\frac{2900}{152} = 19.08 \text{ weeks}$$

$$2017: 7.25 \cdot 40 = \$290 \quad \text{vs. } 12,200$$

$$\frac{12,200}{290} = 42 \text{ weeks}$$

\*Average one-year cost for tuition and fees in current dollars. Source: National Center for Education Statistics.

**Activity 2: Future Cost**

This table shows the cost of college in 2016 and 2017.

$$\frac{\text{New} - \text{Old}}{\text{Old}} \times 100$$

- What is the percent change in the cost of college between 2016 and 2017?

$$\frac{12,200 - 11,900}{11,900} \times 100 = 2.5$$

Year	Cost of College
2016	\$11 900
2017	\$12 200

- Suppose the percent increase stays constant. Write an equation for the relationship between the cost of college one year,  $x$ , and the cost of college the next year,  $y$ .

$$100 + 2.5 = 102.5 \rightarrow 1.025$$

$$y = 1.025$$

- How much will college cost when you graduate from high school?

Show or explain your thinking.

year	cost
2017	12,200
2018	$1.025 \times \$12,200$
2019	$1.025^2 \times 12,200$
2020	$1.025^3 \times 12,200$

year	cost
2021	
2022	
2023	
2024	

- What do you think would be a fair minimum wage in order to reasonably pay for the cost of college when you graduate high school?

**Are You Ready for More?**

Madame C. J. Walker was a business woman who made her fortune by developing a line of cosmetics and hair care for Black women. In 1919, her wealth was valued at approximately \$1 000 000. Every dollar in 1919 is worth 1463% more in 2020. How much would Madam C.J. Walker's fortune be worth in 2020 dollars?

# desmos

## Unit 7.4, Lesson 10: Cost of College

Name \_\_\_\_\_

### Lesson Synthesis

Yosef has \$150 in a savings account. The value of the account will increase by 2% every year. What strategies could Yosef use to calculate how much their savings would be worth in one year? In 10 years?

Write an equation  $y = 1.02x$

and use a table to calculate the value

each year

### Cool-Down

Tyler purchased a vintage video game for \$60. The value of the video game is expected to increase by 4% each year. How much will the video game be worth after two years?

$y = 1.04x$

year	
0	60
1	$1.04 \times 60$
2	$1.04x =$

# desmos

## Unit 7.4, Lesson 11: Notes

Name \_\_\_\_\_

### My Notes

Ex. Wanted 12<sup>"</sup>  
Have 11.5"

$$\frac{(42 - 11.5)}{12} \times 100$$

$$= \frac{0.5}{12} \times 100 \\ = 4.2\%$$

$$\bullet \frac{(17.6 - 12.1)}{17.6} \times 100 =$$

$$= \frac{0.5}{17.6} \times 100 = 2.84\%$$

$$\textcircled{2} \quad \frac{(18.25 - 17.6)}{17.6} \times 100 = 3.7\%$$

$$= \frac{0.65}{17.6} \times 100 = 3.7\%$$

- To calculate
- ① Subtract, ② Divide
- ③ Multiply

1. What is percent error? Create your own example.

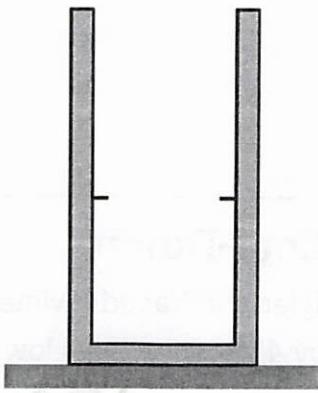
Percent Error - how far away the value you have is from the value you wanted, as a percent

$$\% \text{ Error} = \frac{\text{Want} - \text{have}}{\text{want}} \times 100$$

2. Diamond is making a bookshelf with shelves that are supposed to be ~~17.6~~ centimeters long. Complete the table with the percent error of each shelf that Diamond builds.

Shelf Width (cm)	Percent Error
① 17.1	2.84 %
② 18.25	3.7 %
③ 16.5	6.25 %

Desired shelf length: 17.6 cm



3. The acceptable percent error is 5% for a shelf to fit. Will all of the shelves fit? Why or why not?

No, shelf 3 will not fit.  
because  $6.25 > 5$

Summary  
 $\frac{\text{Want} - \text{Have}}{\text{Want}} \times 100$

I can explain what percent error is and how to calculate it.

I can decide whether a value is within an acceptable percent error.

## My Notes

- ① Fraction is just division
- ② Read as  $7 \div 8$
- ③ Keep columns lined up

Use long division to write each number as a decimal.

$$1.1 \quad \frac{7}{8}$$

$$\begin{array}{r} 0.875 \\ 18 \overline{)7.000} \\ -64 \\ \hline 60 \\ -56 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

Terminating  
"It Ends"

$$1.2 \quad \frac{2}{3}$$

$$\begin{array}{r} 0.\bar{6} \\ 3 \overline{)20.00} \\ -18 \\ \hline 20 \\ -18 \\ \hline 2 \end{array}$$

0.67 Rounded  
0.6 Repeating

- 1.3 Is the decimal representation of  $\frac{7}{8}$  terminating or repeating?

Explain how you know.

Terminating - get a remainder of 0. The decimal stops and does not repeat.

- 1.4 Is the decimal representation of  $\frac{2}{3}$  terminating or repeating?

Explain how you know.

Repeating - The decimal will go on forever in a repeating pattern, you can stop after 2 seconds.

2. When might it be helpful to write a fraction as a decimal?

- ① Comparing fractions
- ② Adding / subtracting fractions with unlike denominators
- ③ When working with percentages

Numerator goes "n" side Summary Inside

I can use long division to write a fraction as a decimal.

I can decide whether a decimal is terminating or repeating and explain how I know.

**Activity 1: Carlos's Calculations**

- 1.1 Finish writing  $\frac{5}{8}$  as a decimal.

$$\begin{array}{r} 0.625 \\ 8 \overline{) 5.000} \\ -48 \\ \hline 20 \\ -16 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

Terminating

- 1.2 Write  $\frac{2}{11}$  as a decimal.

$$\begin{array}{r} 0.\overline{18} \\ 11 \overline{) 2.000} \\ -11 \\ \hline 90 \\ -88 \\ \hline 20 \\ -22 \\ \hline 0 \end{array}$$

$$\boxed{0.\overline{18}}$$

Repeating

- 1.3 What is the same and what is different about these two calculations?

Same:

Different:

**Activity 2: Terminating or Repeating?**

Use long division to write each fraction as a decimal. Then decide if it is terminating or repeating.

2.1  $\frac{3}{20}$

$$\begin{array}{r} 0.15 \\ 20 \overline{) 3.00} \\ -20 \\ \hline 100 \\ -100 \\ \hline 0 \end{array}$$

Terminating

Repeating

2.2  $\frac{3}{9}$

$$\begin{array}{r} 0.3 \\ 9 \overline{) 3.00} \\ -27 \\ \hline 30 \\ -27 \\ \hline 3 \end{array}$$

(Circle one)  
Terminating

Repeating

2.3  $\frac{3}{5}$

$$\begin{array}{r} 0.6 \\ 5 \overline{) 3.0} \\ -30 \\ \hline 0 \end{array}$$

(Circle one)  
Terminating

Repeating

2.4  $\frac{5}{6}$

$$\begin{array}{r} 0.83 \\ 6 \overline{) 5.00} \\ -48 \\ \hline 20 \\ -18 \\ \hline 2 \end{array}$$

(Circle one)  
Terminating

Repeating

**Activity 3: Decimal Deep Dive**

Find fractions that meet as many of these requirements as you can.

**Terminating decimal that ends after:** One digit

$$\frac{3}{5} = 0.6$$

 Two digits

$$\frac{3}{20} = 0.15$$

 Three digits

$$\frac{5}{8} = 0.625$$

 Four digits

$$\frac{65}{8} = 8.125$$

 Five digits Six digits**Repeating decimal that repeats every:** One digit

$$\frac{2}{3} = 0.\overline{6}$$

 Two digits

$$\frac{2}{11} = 0.\overline{18}$$

 Three digits

$$\frac{5}{7} = 0.\overline{714285}$$

 Four digits Five digits Six digits

## Lesson Synthesis

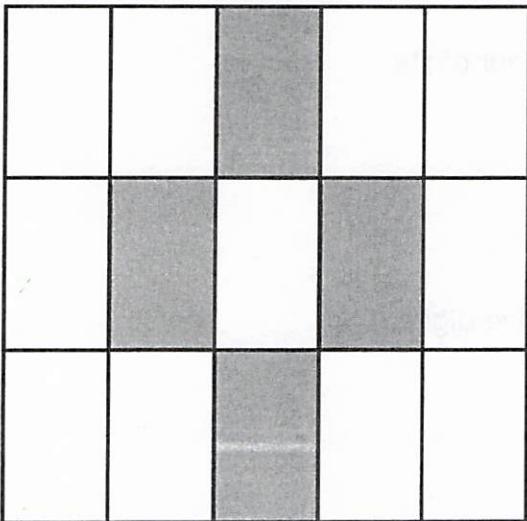
$$\begin{array}{r} 0.375 \\ 8 \overline{) 3.000} \\ -24 \\ \hline 60 \\ -56 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

$$\frac{3}{8} = 0.375$$

What advice would you give someone to help them write a fraction as a decimal?

- ① Real fraction out loud so you know the order
- ② Start by putting 0. on top as a place holder

## Cool-Down



$\frac{4}{15}$  of this mosaic is shaded.

Use long division to write  $\frac{4}{15}$  as a decimal.

$$\begin{array}{r} 0.26\overline{6} \\ 15 \overline{) 4.000} \\ -30 \\ \hline 100 \\ -90 \\ \hline 100 \end{array}$$