

ACCELERATED MATHEMATICS: CHAPTER 6

FOOD AND RESTAURANTS



THE FOOD PYRAMID ACCORDING TO Kids

BREATH & GAS GROUP

Eat as needed for
desired effect

BEVERAGE GROUP

6-8 servings

INEDIBLE GROUP

Only when you can't resist

CHOCOLATE GROUP

As many servings
as you can get

GROSS GROUP

Eat sparingly, preferably
with witnesses

PORTABLE GROUP

2-3 servings

CONDIMENT GROUP

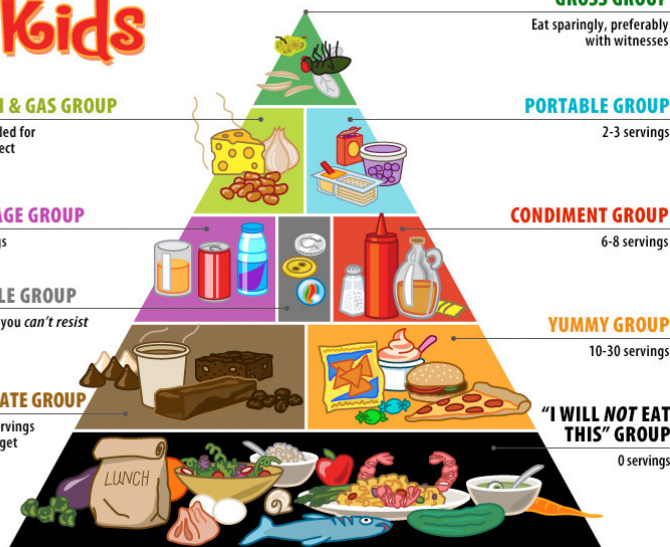
6-8 servings

YUMMY GROUP

10-30 servings

"I WILL NOT EAT THIS" GROUP

0 servings



PERCENTAGE TOPICS COVERED:

- Percentages
- Fraction-Decimal-Percentages
- Percent of a number
- Sales, discounts, taxes, and tips
- Create a Menu Project
- Percent equations and/or percent lines
- Simple interest
- Percent of change
- Markup/Markdown



Percentages are a set of fractions that have denominators of 100. What words have the root “cent” which mean 100? Restaurants use percents to determine profits, costs, and losses. Bankers use percents to compute interest. Taxes are determined using percents. In basketball you have free throw percents, in football quarterbacks complete a certain percent of their passes. Big sales (50% off!) are in percents and even your math grade is a percent!

Percent comes from Latin “per centum.” Per means out of and centum means one hundred. Thus, percent means out of one hundred.

$\frac{23}{100}$ is a fraction that represents 23 out of 100.

0.23 is a decimal that represents 23 out of 100.

23% is a percent that represents 23 out of 100. $\frac{23}{100} = 0.23 = 23\%$

Shade in the indicated amount. Then write the fraction as a decimal and a percent.

$\frac{12}{100} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

$\frac{7}{100} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

$\frac{35}{100} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

Numbers that have 6 as a factor

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$\frac{\hspace{2cm}}{100} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

Numbers that have 7 as a factor

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$\frac{\hspace{2cm}}{100} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

Percent to Decimal 480% $\frac{1}{2}\%$	Decimal to Percent 7
Percent to Fraction -518% 0.15%	Fraction to Percent $\frac{2}{11}$
Decimal to Fraction 6.381	Fraction to Decimal $-5\frac{7}{11}$

$$33\frac{1}{3}\% = \frac{1}{3}$$

$$66\frac{2}{3}\% = \frac{2}{3}$$

Converting percentages to fractions

Percent to a fraction	Write the percent number over 100 and simplify
	<i>Example 1:</i> $78\% = \frac{78}{100} = \frac{39}{50}$
	<i>Example 2:</i> $6.2\% = \frac{6.2}{100} \cdot \frac{10}{10} = \frac{62}{1000} = \frac{31}{500}$

Convert the following percentages to fractions in simplest form.

1.	84%		2.	35%		3.	7%	
4.	80%		5.	-10%		6.	99%	
7.	75%		8.	95%		9.	64%	
10.	50%		11.	-4%		12.	28%	
13.	-51%		14.	91%		15.	57%	
16.	33%		17.	48%		18.	-18%	
19.	1.8%		20.	15.75%		21.	0.05%	
22.	-12.5%		23.	1.3%		24.	23.46%	



25.	Mr. Underwood made 72% of his free throws. What fraction did he make?
26.	Mr. Mangham ate 58% of the Little Debbies in his classroom. What fraction did he eat?
27.	Principal Hart has a 73% approval rating from the students at DIS. What fraction approve of Ms. Hart?
28.	64% of Carroll ISD students like french fries. What fraction of students do NOT like french fries?
29.	99.8% of all DVD's players have no malfunctions in their first year. What fraction have no malfunctions in their first year?

Express each percent as a fraction or mixed number in simplest form.

30.	0.15%		31.	250%		32.	0.06%	
33.	0.5%		34.	165%		35.	350%	
36.	0.25%		37.	0.1%		38.	110%	

Converting percentages to decimals and decimals to percentages

When converting between percents and decimals, the Dr. Pepper Method serves as a reminder of which way to move the decimal.

Decimal to a percentage	<p><i>The Dr. Pepper (DP) Method</i></p>  <p>When converting a decimal to a percent, move the decimal point two places to the right.</p> <p>Ex. $3.427 = 342.7\%$</p>
Percentage to a decimal	<p><i>The Dr. Pepper (DP) Method</i></p>  <p>When converting a percent to a decimal, move the decimal point two places to the left.</p> <p>Ex. $2.4\% = 0.024$</p>

Convert between the following decimals and percentages.

1.	65%		2.	70%		3.	5%		4.	9%	
5.	15.7%		6.	3.4%		7.	0.5%		8.	-220%	
9.	-0.05		10.	0.3		11.	2		12.	0.025	
13.	0.525		14.	0.005		15.	0.09		16.	0.6	
17.	-3.5		18.	1.515		19.	.25		20.	0.00625	
21.	-42%		22.	18%		23.	77%		24.	4.2%	
25.	1.8%		26.	-9%		27.	2%		28.	5%	
29.	20%		30.	50%		31.	-0.38%		32.	0.94	
33.	0.75		34.	0.094		35.	0.075		36.	0.04	
37.	0.08		38.	-55		39.	0.8		40.	4.1	

Express each percent as a decimal.

41.	316%		42.	0.02%		43.	0.15%	
44.	2,345%		45.	$\frac{1}{4}\%$		46.	$\frac{1}{2}\%$	

Decimal to a fraction	<p>Simply read the decimal the correct way and simplify</p> <p>Example: $.318 = \text{three hundred eighteen thousandths} = \frac{318}{1000}$</p> $\frac{318}{1000} = \frac{159}{500}$
Fraction to a decimal	<p>Divide!</p> <p>Example: $\frac{2}{3} = 2 \div 3 = \overline{.6}$</p>

Write each decimal as a fraction or mixed number in simplest form.

1.	-0.3		2.	0.06		3.	4.75	
4.	3.15		5.	7.6		6.	0.004	
7.	0.782		8.	0.493		9.	0.758	
10.	-0.33		11.	0.47		12.	0.04	
13.	0.002		14.	-0.65		15.	0.16	

Express each fraction or mixed number as a decimal. Use bar notation, if necessary.

16.	$-9\frac{2}{5}$		17.	$7\frac{1}{18}$		18.	$-3\frac{24}{25}$	
19.	$4\frac{1}{6}$		20.	$-\frac{6}{7}$		21.	$5\frac{8}{9}$	
22.	$-10\frac{17}{20}$		23.	$-2\frac{11}{18}$		24.	$-6\frac{2}{7}$	
25.	$14\frac{5}{8}$		26.	$-\frac{3}{13}$		27.	$7\frac{9}{10}$	

28.	Order $\frac{1}{2}\%$, 50%, 5%, and 500% from least to greatest.	
29.	Write 1.07%, 0.7%, 107%, 0.07% and 1 in order from greatest to least.	

Fraction to a percentageConvert the fraction to a decimal and then the decimal to a percent OR
Set up a proportion.**Convert each fraction as a percent.**

1.	$\frac{1}{2}$		2.	$\frac{1}{4}$		3.	$\frac{3}{4}$	
4.	$\frac{4}{5}$		5.	$4\frac{1}{10}$		6.	$\frac{3}{10}$	
7.	$-8\frac{1}{3}$		8.	$\frac{9}{10}$		9.	$\frac{1}{8}$	
10.	$\frac{13}{8}$		11.	$\frac{5}{8}$		12.	$\frac{7}{8}$	
13.	$\frac{1}{3}$		14.	$\frac{2}{3}$		15.	$-7\frac{5}{6}$	
16.	1		17.	$5\frac{1}{9}$		18.	$3\frac{23}{50}$	
19.	$\frac{19}{25}$		20.	$3\frac{8}{9}$		21.	$\frac{24}{40}$	

Write <, >, or = to make each sentence true.

22.	$\frac{1}{4}$	$\frac{9}{40}$	23.	$11\frac{13}{40}$	$11\frac{3}{8}$
24.	$1\frac{3}{8}$	1.375	25.	$\frac{2}{25}$	$\frac{22}{250}$
26.	2.78	$2\frac{39}{50}$	27.	$\frac{3}{10}$	$\frac{29}{100}$

28.	What is the sum of 0.5 and $\frac{3}{4}$?	
29.	What is the product of 0.5 and $\frac{3}{4}$?	
30.	What is $\frac{\frac{3}{4}}{0.5}$?	

Which number is the least?

31.	$\frac{3}{8}, 0.4, \frac{4}{11}, 0.03\bar{5}, \frac{5}{13}$	
32.	$\frac{7}{9}, 0.778, 0.\overline{78}, \frac{11}{13}, 0.787$	

Genetic traits are characteristics that are passed from the parents to their children. Children receive half of their traits from their mother and half from their father. Some traits have a wide variety (eye color, hair color), while others have only two possible forms. In this activity you will identify some common genetic traits and find the percent of students in our class that possess each.

Complete the table below with your partner.

Trait	Description	You	Class Total	
Handedness	(A) Left or (B) Right			
Hairline	(A) Straight or (B) Peaked			
Dimples	(A) Yes or (B) No			
Freckles	(A) Yes or (B) No			
Hair Whorl	(A) Clockwise or (B) Counterclockwise			
Ear Lobe	(A) Free or (B) Attached			
Tongue	(A) Roller or (B) Non-roller			

Find the percent of each trait in the class and complete the table below. Round to the nearest tenth.

Trait	Class Percent			
Handedness	Left		Right	
Hairline	Straight		Peaked	
Dimples	Yes		No	
Freckles	Yes		No	
Hair Whorl	Clockwise		Counterclockwise	
Ear Lobe	Free		Attached	
Tongue	Roller		Non-roller	

1.	Do the traits add up to 100%? Explain why or why not?	
2.	What is the most common trait in our class?	
3.	Do we have any traits evenly distributed throughout our class?	

Convert between fractions, decimals, and percentages to complete the table below.

	Fraction (simplified)	Decimal	Percent
1./2.			Taco Bell has 2.2% of the fast food market.
3./4.			McDonalds has 7.8% of the fast food market.
5./6.			Dairy Queen has 1.2% of the fast food market.
7./8.			1.5%
9./10.			150%
11./12.		Dominoes has 0.011 of the fast food market.	
13./14.		Subway has 0.013 of the fast food market.	
15./16.		KFC has 0.018 of the fast food market.	
17./18.		Burger King has 0.034 of the fast food market.	
19./20.		1.25	
21./22.	Pizza Hut has $\frac{1}{40}$ of the fast food market.		
23./24.	Hardees has $\frac{3}{200}$ of the fast food market.		
25./26.	Wendys has $\frac{1}{50}$ of the fast food market.		
27./28.	$\frac{24}{25}$		
29./30.	$\frac{16}{25}$		

On a separate sheet of paper, place the following numbers in order from greatest to least.

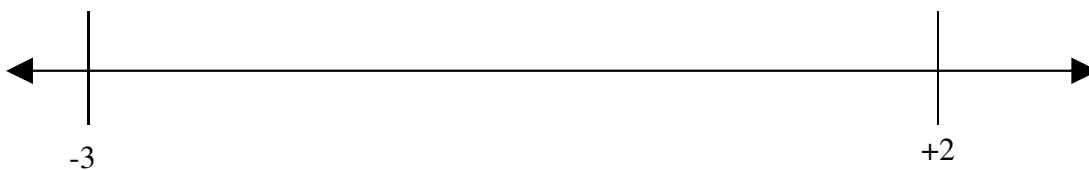
31.	$0.875, \frac{9}{10}, \frac{15}{16}, 0.98, 100\%, 9\%$	32.	$75\%, 0.55, \frac{13}{20}, 45\%, \frac{17}{20}$
33.	$1\%, 0.001, \frac{1}{99}, \frac{1}{101}, 0.1$	34.	$0.9, 85\%, \frac{9}{10}\%, \frac{1}{2}$
35.	On your separate paper rank the top 10 fast food restaurants listed above in order of market share (greatest to least).		

Place the following numbers on the number line below.

$$-0.25, \frac{6}{8}, \frac{2}{3}, -2, 0.75, 1.5, -1, \frac{2}{5}, 0, -0.6, \frac{3}{2}$$

$$100\%, -150\%, 42\%, -3.7\%, 0.37\%, 78\%, -75\%$$

$$1\frac{2}{5}, -0.4$$



Write the number that is the greatest.

1.	$\frac{3}{5}, \frac{5}{7}$		2.	$\frac{4}{9}, \frac{5}{11}$		3.	$3\frac{2}{11}, 3\frac{1}{9}$	
4.	$0.2, \frac{2}{11}$		5.	$0.25, \frac{5}{21}$		6.	$8\frac{10}{27}, 8.3$	
7.	$-\frac{8}{13}, -\frac{5}{13}$		8.	$-\frac{2}{5}, -\frac{6}{7}$		9.	$-\frac{2}{9}, -\frac{9}{11}$	
10.	$-4.5, -4.55$		11.	$-3.57, -3.5$		12.	$-1.9, -1.99$	

Order from greatest to least.

13.	$-5.81, -5\frac{3}{4}, -5\frac{3}{5}, -5.69$	
14.	$-1.01, -1.1, -1\frac{1}{9}, -1\frac{1}{11}$	

Write the ratio that is indicated in each row. Then circle the percent that is equivalent to it.

	A	B	Ratio		
15.	one dozen pears	48 pears	A to B		0.25% 2.5% 25%
16.	hours in a day	seconds in a minute	A to B		0.4% 4% 40%
17.	months in a year	minutes in 1 hour	B to A		5% 50% 500%
18.	1 meter	meters in 1 kilometer	A to B		0.1% 1% 10%
19.	days in 3 weeks	months in 2 years	A to B		0.865% 8.75% 87.5%
20.	letters in <i>mountain</i>	letters in <i>ratio</i>	B to A		6.25% 62.5% 160%

(Adapted from Dinah Chancellor, 1998)

Cut out cards below.

Recreate the template provided on one side of your construction paper and place all the pieces in the correct locations.

$\frac{2}{3}\%$	198%	$-\frac{7}{4}$	31%	100%	-60%	88.8%	$-0.\overline{323}$
$0.\overline{01}$	$-\frac{1}{6}$	$0.6\overline{23}$	$0.\overline{623}$	$-1\frac{2}{3}$	$-1\frac{7}{8}$	-0.08	$\frac{1}{15}$
-199%	$\frac{3}{5}\%$	$-\frac{9}{5}\%$	$1\frac{3}{7}$	$-\sqrt{4}$	0	$\sqrt{9}$	-1.82
$\frac{7}{8}$	$-\sqrt{7}$	$\sqrt{3}$	$\sqrt{2}$	π	$-\frac{11}{6}$	0.9%	$\frac{6}{3}$

Cut out cards below. On the other side of your construction paper organize the cards from *greatest to least*.

$\frac{2}{3}\%$	198%	$-\frac{7}{4}$	31%	100%	-60%	88.8%	$-0.\overline{323}$
$0.\overline{01}$	$-\frac{1}{6}$	$0.6\overline{23}$	$0.\overline{623}$	$-1\frac{2}{3}$	$-1\frac{7}{8}$	-0.08	$\frac{1}{15}$
-199%	$\frac{3}{5}\%$	$-\frac{9}{5}\%$	$1\frac{3}{7}$	$-\sqrt{4}$	0	$\sqrt{9}$	-1.82
$\frac{7}{8}$	$-\sqrt{7}$	$\sqrt{3}$	$\sqrt{2}$	π	$-\frac{11}{6}$	0.9%	$\frac{6}{3}$

Real Numbers

Imaginary Numbers

Rational Numbers

Irrational Numbers

Integers

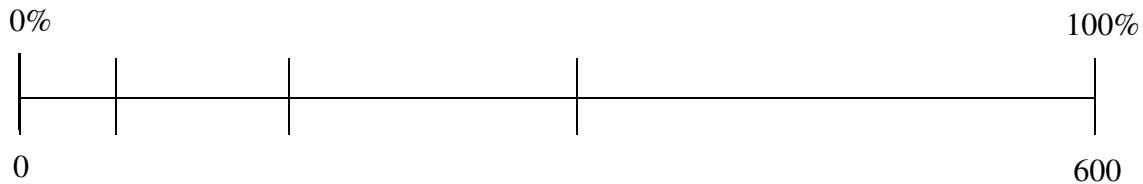
Whole Numbers

Natural Numbers

Gallop surveyed people in the United States concerning their favorite food.

Favorite Foods in America (yes, this was a true survey)

1.	Hamburgers	4.	Oreo Cookies	7.	Ice cream
2.	Hot Dogs	5.	Pizza	8.	Donuts
3.	French Fries	6.	Chicken Tenders	9.	Potato Chips



The following questions are based only on the 600 people who voted for hamburgers, hot dogs, french fries, or pizza.

1.	10% voted for pizza. How many people voted for pizza?	
2.	25% voted for hot dogs. How many people voted for hot dogs?	
3.	50% voted for hamburgers. How many people voted for hamburgers?	
4.	15% voted for French fries. How many people voted for French fries?	
5.	What percentage of people did not vote for French fries?	
6.	How many people did not vote for pizza?	
7.	What percentage of people did not vote for hot dogs?	

Number	0%	10%	25%	50%	100%
20					
40					
120					
800					

%	Pattern
0	
10	
25	
50	
100	

Use the information in the box below and mental math to help you solve the problems.

Percent	Fraction	Decimal	Means	What To Do
200%	$\frac{2}{1}$	2.00	twice as much	Multiply by 2
100%	$\frac{1}{1}$	1.00	the same as the number	Write the number
75%	$\frac{3}{4}$	0.75	$\frac{3}{4}$ as much	Multiply by $\frac{3}{4}$ or 0.75 (divide by 4, then multiply by 3)
50%	$\frac{1}{2}$	0.5	$\frac{1}{2}$ as much	Multiply by $\frac{1}{2}$ or 0.5 (or divide by 2)
25%	$\frac{1}{4}$	0.25	$\frac{1}{4}$ as much	Multiply by $\frac{1}{4}$ or 0.25 (or divide by 4)
10%	$\frac{1}{10}$	0.1	$\frac{1}{10}$ as much	Multiply by $\frac{1}{10}$ or 0.1 (or divide by 10)
1%	$\frac{1}{100}$	0.01	$\frac{1}{100}$ as much	Multiply by $\frac{1}{100}$ or 0.01 (or divide by 100)

Solve mentally.

1.	100% of 16		2.	10% of 80		3.	50% of 60	
4.	200% of 10		5.	25% of 104		6.	50% of 50	
7.	200% of 4		8.	100% of 23		9.	25% of 96	
10.	100% of 200		11.	50% of 40		12.	25% of 100	
13.	10% of 150		14.	75% of 40		15.	100% of 10	
16.	10% of 230		17.	50% of 38		18.	10% of 200	
19.	200% of 7		20.	10% of 240		21.	25% of 44	
22.	100% of 12		23.	200% of 6		24.	10% of 400	
25.	5% of 500		26.	1% of 300		27.	1% of 1000	

Find the percent of each number.

1.	75% of 52		2.	40% of 65		3.	15% of 80	
4.	30% of 24		5.	62.5% of 96		6.	9% of 20	
7.	28% of 75		8.	95% of 60		9.	70% of 15	
10.	12% of 300		11.	85% of 48		12.	125% of 16	
13.	0.6% of 5		14.	36% of 175		15.	48% of 50	
16.	160% of 90		17.	65% of 120		18.	87.5% of 56	
19.	5% of 85		20.	2.5% of 4		21.	0.4% of 150	
22.	120% of 70		23.	37.5% of 104		24.	52% of 25	

Solve each word problem.

25.	Michael read 35% of his 140-page book. How many pages did he read?
26.	Lisa delivered 75% of her 120 newspapers. How many papers did she deliver?
27.	Of the 368 students enrolled at Carroll Middle School, 276 take either band or choir. What percentage of CMS's students take band or chorus?
28.	25% of Johnson's 132 fourth graders made the honor roll. One-third of the honor roll students made straight A's. How many fourth graders made straight A's?
29.	In a basketball game, Jenna made 50% of her 3-point shots, 75% of her 2-point shots, and 100% of her free throws. If Jenna attempted 14 3-pointers, 8 2-pointers, and 1 free throw, how many points did she score?
30.	What percent of the states in the United States have two word names?
31.	Brad just celebrated his eighth birthday. His dad's age is 375% of Brad's. How old will Brad's dad be in three years?
32.	50% of one year equals how many weeks?
33.	40% of the states are larger in area than Georgia. What is Georgia's rank in area?
34.	25% of a gallon of milk equals how many ounces?
35.	50% of three dimes, three nickels, and three pennies equals...
36.	75% of a yard equals how many inches?
37.	25% of the band and choral students at Carroll Middle School are in beginning band, which is made up of one-third girls. How many girls are in beginning band?
38.	75% of the months that end with the letter "y" have ____ days each.
39.	59% of a piano's keys are white. What's the difference between the percentage of white keys and black keys?

Tax is applied as a percent of a number. If tax is 8% and the cost of the item is \$50, then 8% of 50 will calculate the amount of tax. The total cost is the cost of the item plus tax.

Determine the tax and the total cost.

	Item Cost	Percent Tax	Amount of Tax	Total Cost
1.	\$40	7%		
2.	\$88	4%		
3.	\$125	6%		
4.	\$200	5.5%		
5.	\$75	9%		
6.	\$350	5%		

Tip is applied as a percent of a number. If you leave a 20% tip on a dinner bill of \$50, then 20% of \$50 will calculate the amount of tip. The total cost is the dinner bill plus the tip.

Determine the tip and the total cost.

	Dinner Cost	Percent Tip	Amount of Tip	Total Cost
7.	\$60	15%		
8.	\$56	10%		
9.	\$94	20%		
10.	\$15	12%		
11.	\$75	18%		
12.	\$165	25%		

Income tax is applied as a percent of the money a person makes. If tax is 15% and you make \$30,000 (your gross income) in a year, then 15% of 30,000 will calculate the amount of tax. The net money is the money you have left over after taxes.

Determine the tax and net income.

	Gross Income	Percent Tax	Amount of Tax	Net Income
13.	\$30,000	10%		
14.	\$50,000	15%		
15.	\$45,000	20%		
16.	\$38,000	12%		
17.	\$100,000	25%		
18.	\$530,000	35%		

You now get to create a menu for your restaurant! The menu should include the following items:

- A restaurant name**
- A menu with prices for every item**
- The menu should contain at least:**
 - 3 appetizers
 - 6 entrees (main dishes)
 - 5 side items
 - 4 desserts
 - 5 beverages (no alcohol)

Please have each item listed a la carte (individually) – no combo meals.

Total meal price per person (for planning purposes)	Fast Food	Lunch = \$4-8, Dinner = \$5-10
	Casual	Lunch = \$7-15, Dinner = \$12-25
	Fine	Lunch = \$15-50, Dinner = \$20-75

Items on the menu must be edible. Prices should be somewhat realistic.
Review standard meal prices on your summary form.

<u>Ideas for a Theme/Concept</u>	<u>Choosing a Name</u>
A certain style of food	Name of someone significant to you
An individual dish	Geography
Ethnic influence	Historic or traditional names and spaces
Décor and ambience	Ethnic and cultural names
A character from a book, movie, or TV show	Pop culture
Sporting events, hobbies, or games	Weather
Geography	Humor and irony

Menus nominations for awards will be given for the following categories:

- Best Theme
- Best Hand-Drawn Logo
- Most Creative Original Restaurant Name
- Most Creative Food Item Name/Description
- Best Original Slogan
- Best Overall Presentation
- Best “Extra” Item
- Best Overall Menu (based on fun, creativity, and originality)

IMPORTANT: If you use another student’s name in any way as part of your menu you must obtain their permission first.

Restaurant Name				
Type of Restaurant (circle one) Fast Food/Fast Casual – McDonalds, Jason’s Deli, Chick-Fil-A, Wingstop Casual Dining – Chili’s, Olive Garden, Joe’s Crab Shack Fine Dining – An expensive steakhouse or seafood place		Fast Food	Casual Dining	Fine Dining
Number of Seats (circle one)	Fast Food	50	75	100
	Casual	150	175	200
	Fine	75	100	125

The next step to determine the overall income for your restaurant is to know the average amount of money you would make in one day.

		Fast Food	Casual	Fine
	Average Lunch Check per Person	\$6.00	\$11.00	\$27.00
	Average Dinner Check per Person	\$8.00	\$19.00	\$48.00

Next, you need to find out how many people you will serve each day. Restaurants call this the number of covers. This is based on table turnover or how many people eat per each seat in your restaurant. Find your turnover in the chart below.

		TURNOVER
LUNCH	Fast Food	4
	Casual	1.5
	Fine	0.5
DINNER	Fast Food	6
	Casual	2
	Fine	1.25

So how much money does your restaurant bring in during lunch and during dinner?

Lunch = Average Lunch Check per Person • Turnover • Number of Seats

Dinner = Average Dinner Check per Person • Turnover • Number of Seats

Meal	Average Check	Turnover	Seats	Total Revenue
Lunch				
Dinner				
Total per Day				
Total per Month (Total per Day • 30)				

Expense Report/Income Statement

		Percentage	Monthly Example ***
Total Revenue	A		\$270,000
Food Sales	B	90%	\$243,000
Beverage Sales	C	10%	\$27,000
Food Cost	D	35%	\$85,050
Beverage Cost	E	28%	\$7,560
COGS (Cost of Goods Sold)	F	34.3%	\$92,610
Gross Profit	G	65.7%	\$177,390
Payroll	H	30%	\$81,000
Benefits	I	4.4%	\$11,880
Total Payroll	J	34.4%	\$92,880
Direct Operating Expenses*	K	5%	\$13,500
Marketing/ Entertaining/Advertising	L	1.5%	\$4,050
Energy/Utilities	M	3.5%	\$9,450
General/Administrative	N	4%	\$10,800
Repairs/Maintenance	O	2%	\$5,400
Total Operating Expenses	P	16%	\$43,200
Gross Operating Profit	Q	15.3%	\$41,310
Rent/Lease expenses	R	4.3%	\$11,610
Real estate taxes	S	2%	\$5,400
Insurance	T	1.2%	\$3,240
Total Other Expenses	U	7.5%	\$20,250
Adjusted Profit	V	7.8%	\$21,060
Interest	W	1%	\$2,700
Depreciation	X	2%	\$5,400
Net Income** (Profit/Loss)	Y	4.8%	\$12,960

* Telephone, accounting, legal, office supplies, paper, china, glass, menus, landscaping, cleaning supplies, etc.

** Net income before income taxes

*** Average monthly sales per Chili's restaurant

Item	How To Complete
A	On your Menu Finances page you already determined the monthly income for your restaurant. Copy this number in Box A.
B	We will use the industry average of about 90% of sales coming from food items. B = 90% of A
C	The remaining 10% of sales are for beverages. C = 10% of A
D	Restaurants use the food cost percentage to help determine the price of menu items. Typically, the price of the food may be about 3 times the ingredients it takes to prepare the food. That would be a food cost percentage of 33%. Most places target between 20-40% for this number. $\text{Food Cost Percentage} = \frac{\text{Cost of Raw Ingredients}}{\text{Selling Price}} \cdot 100$ D = % of B
E	Same as D, except beverages usually have a lower percentage because the cost is so low that restaurants can make a higher percentage profit on drinks. E = % of C
F	Cost of goods sold or COGS. For the dollar amount: F = D + E
G	Your gross profit is how much you made on the food and drink before you take out all your other expenses. G = A - F
H, I, J	Now you have to pay all of your managers, waiters, cooks, etc. They get paid a certain amount plus you have to pay for their benefits, like health insurance. H = % of A I = Dice % of A J = H+I
K to P	Next, you add all the other expenses in owning a restaurant - the cost of plates and utensils, menus, furniture, and kitchen supplies, advertising your business, phone and electricity, paperwork, repairs, maintenance of your building and grounds....the list goes on and on. P = % of A
Q	Now you have your gross operating profit. Q = G - J - P
R, S, T, U	Next you have to pay for your occupancy (rent, equipment rental, real estate taxes, insurance, property taxes, etc.) U = % of A
V	Your adjusted profit is: V = Q - U
W, X	Depreciation is an accounting process of spreading out your capital costs over time. Interest is what you have to pay on all loans you have taken out to run the restaurant. W and X are a % of A
Y	The bottom line! Hopefully you are making money! Most profitable restaurants will have a bottom line of 3-8%. This means for every \$100 they sell, they make between \$3 and \$8. Y = V - W - X

Expense Report/Income Statement for _____

		Percentage		Monthly
Total Revenue	A			
COGS (Cost of Goods Sold)	B	30%	34%	
Gross Profit	C	A – B =		
Total Payroll & Benefits	D	33%	40%	
Direct Operating Expenses		around 5%		
Marketing/Entertaining/Advertising		around 1.5%		
Energy/Utilities		around 3.5%		
General/Administrative		around 4%		
Repairs/Maintenance		around 2%		
Total Operating Expenses	E	15%	18%	
Gross Operating Profit	F	C – D – E =		
Rent/Lease expenses		around 4%		
Real estate taxes		around 2%		
Insurance		around 1.2%		
Total Other Expenses	G	6%	10%	
Adjusted Profit	H	F – G =		
Interest & Depreciation	I	3%		
Net Income (Profit/Loss)	J	H – I =		

- COGS 30% 0-1 sibling, 34% 2+ siblings
- Payroll & Benefits 33% BDay Jan-June, 40% BDay July-Dec
- Operating Expense 18% Dogs+Cats = 0 or 1, 15% for 2+
- Other Expenses 6% Age 11 or less, 10% 12+

Restaurant Name	
Owner	
Server	
Guest	
Chef	

Items Ordered		Price
Appetizer		
Entrée		
Side Item		
Beverage		
Dessert		
Other		
***** TOTAL (before daily discount) *****		
Daily discount	____ %	Calculate x% of your total above
***** TOTAL FOOD PRICE ***** [Total – Daily discount]		(A)

		<i>Guest Calculations</i>		<i>Server Calculations</i>	
Tax	8% = _____ (convert to decimal)	Calculate 8% of (A)			(B)
Subtotal before tip		Add (A) + (B)			(C)
Tip 10% poor, 15% good, or 20% excellent service	____ % = _____ (convert to decimal)	Choose a tip Calculate x% of (A)	(D)		
Total bill		Add (C) + (D)	(E)		
Amount of CASH given to server (you only have \$50 bills)		A multiple of \$50 large enough to pay for the bill	(F)		
Change provided to customer		Subtract (F) – (E)			(G)
Restaurant Profit for Owner	6% = _____ (convert to decimal)	Calculate 6% of (A)			(H)
Amount of tip for Server	50% = _____ (convert to decimal)	Calculate 50% of (D)			(I)
Amount of tip for Chef	25% = _____ (convert to decimal)	Calculate 25% of (D)			(J)

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We hope you have enjoyed your meal. Ya'll come back now, you hear.

Discounts**Example 1:** Regularly \$212.50 – 10% discount

To calculate the discount multiply \$212.50 by 0.1 (the equivalent of 10%).

$$\$212.50 \cdot 0.1 = \$21.25$$

The discount is \$21.25. This is how much you SAVE off the original price.

Sale Prices**Example 2:** Regularly \$88.75 – 20% off sale

There are two ways to calculate the sale price.

1. Calculate the discount and subtract the discount from the original price.

$$\$88.75 \cdot 0.2 = \$17.75$$

$$\$88.75 - \$17.75 = \$71.00$$

The sale price is \$71.00

2. Multiply the price by the percentage of the price remaining. In this example, 80% of the original price is still left.

$$\$88.75 \cdot 0.8 = \$71.00$$

What is the sale price of a \$62 sweater if it is:

1.	30% off	2.	25% off	3.	15% off	4.	80% off
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What is your discount if your bill is \$49.50 and you get a:

5.	10% discount	6.	30% discount	7.	4% discount	8.	50% discount
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Find the amount of the discount and the sale price.

	Regular Price	Savings	Discount	Sale Price
9./10.	\$1,200	12%		
11./12.	\$70	30%		
13./14.	\$120	15%		
15./16.	\$16.50	50%		
17./18.	\$60	40%		
19./20.	\$160	25%		
21./22.	\$85	100%		
23./24.	\$124	0%		
25./26.	\$90	40%		
27./28.	\$125	20%		
29./30.	\$500	15%		

Bargain Becky loves to get a good deal and won't buy anything unless it's on sale. She decided to go to Mangham's Maniac Munchies where everything is on sale!

*** Mangham's Maniac Munchies ***					
Chicken, 10 lbs.	\$26.50	40% off	Turkey, 15 lbs.	\$32.40	20% off
Pork, 8 lbs.	\$24.00	25% off	Ice Cream, 6 cartons	\$18.50	10% off
Hamburger, 12 lbs.	\$28.60	15% off	Beans, 50 lbs.	\$30.00	12% off
Potatoes, 20 lbs.	\$7.20	35% off	Pecan Pie, 6	\$31.90	50% off
Shrimp, 4 lbs.	\$27.40	30% off	Hot Dogs, 100	\$12.00	8% off
Lobsters, 4 live	\$34.00	45% off	Rice, 50 lbs.	\$28.20	5% off

Use the table above to answer the following questions.

1.	What is the discount on 12 lbs. of hamburger?	2.	What is the discount on 100 lbs. of beans?
3.	What is the sale price for 20 lbs. of potatoes?	4.	What is the sale price for 150 lbs. of rice?
5.	What is the sale price for 4 lbs. of shrimp?	6.	What is the sale price for 75 lbs. of turkey?
7.	What is the discount on 8 lbs. of pork?	8.	What is the discount on 30 cartons of ice cream?
9.	What is the discount on 4 live lobsters?	10.	What is the sale price of 800 hot dogs?
11.	What is the sale price for 20 lbs. of chicken?	12.	What is the discount on 24 pecan pies?

Find the amount of the discount and the sale price.

	Regular Price	Savings	Discount	Sale Price
13./14.	\$52	25%		
15./16.	\$80	20%		
17./18.	\$36.50	40%		
19./20.	\$17.80	10%		
21./22.	\$250	18%		

23. Jodie wants to buy a shirt regularly priced at \$20. The shirt goes on sale for 15% off the regular price. Which equation can be used to determine s , the sale price of the shirt, not including tax?

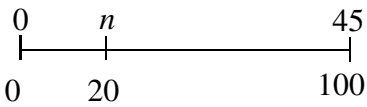
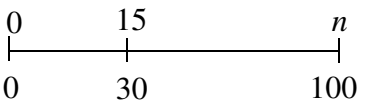
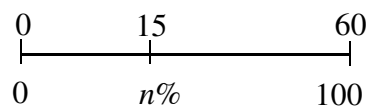
- A. $s = 20 - (20)(0.15)$
- B. $s = 20 - (20 + 0.15)$
- C. $s = 20(0.15)$
- D. $s = 20 + 0.15$

To model a percent problem you can write an equation or model the problem with a percent line.

Solving percent problems with equations.

<p>What is 20% of 45?</p> $n = 0.20 \cdot 45$ $n = 9$	<p>15 is 30% of what?</p> $15 = 0.3 \cdot n$ $\frac{15}{0.3} = \frac{0.3n}{0.3}$ $50 = n$	<p>What percent of 60 is 15?</p> $\frac{n}{100} \cdot 60 = 15$ $n \cdot 60 = 1500$ $\frac{60n}{60} = \frac{1500}{60}$ $n = 25\%$
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Solving percent problems with percent lines.

<p>What is 20% of 45?</p>  $\frac{n}{20} = \frac{45}{100}$ $100n = 900$ $\frac{100n}{100} = \frac{900}{100}$ $n = 9$	<p>15 is 30% of what?</p>  $\frac{15}{30} = \frac{n}{100}$ $30n = 1500$ $\frac{30n}{30} = \frac{1500}{30}$ $n = 50$	<p>What percent of 60 is 15?</p>  $\frac{15}{n} = \frac{60}{100}$ $60n = 1500$ $\frac{60n}{60} = \frac{1500}{60}$ $n = 25\%$
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Use either an equation or a percent line to model each problem. Do not solve.

1. What is 10% of 55?	2. 12 is 20% of what?
3. What percent of 40 is 25?	4. 60 is 30% of what?
5. What is 90% of 400?	6. What percent of 16 is 12?
7. What is 75% of 68?	8. What percent of 100 is 38?
9. 40 is 10% of what?	10. What is 25% of 700?
11. 1 is what percent of 3?	12. What percent of 240 is 30?

Solve each problem. Use either an equation or a percent line.

13. What is 30% of 50?	14. 6 is 50% of what?
15. What percent of 18 is 12?	16. 30 is 20% of what?
17. What percent of 100 is 45?	18. What is 80% of 200?
19. What is 75% of 88?	20. 16 is 40% of what?
21. What percent of 50 is 32?	22. What percent of 9 is 12?
23. If 3 is 5% of a number, what is 30% of that number? Explain how you solved the problem after showing all of your work.	

Solve each problem. Use either an equation or a percent line.

1.	40% of what number is 36?	2.	12 is 6% of what number?
3.	5% of what number is 2?	4.	8 is 20% of what number?
5.	77 is 77% of what number?	6.	80% of what number is 520?
7.	12% of what number is 3?	8.	21 is 5% of what number?
9.	Find 12.5% of 72.	10.	30% of what amount is \$2,400?
11.	\$15 is what percent of \$240?	12.	What percent of 120 is 48?
13.	Find 106% of 55.	14.	\$4 is what percent of \$50?
15.	What percent of 1,000 is 2?	16.	What is 2.3% of 610?
17.	91 is 140% of what number?	18.	What percent of 200 is 400?
19.	How much sales tax, at a rate of 5.5%, is due on the sale of a \$8,696 car?		
20.	A pop quiz was passed by 24 out of 28 students. What percent passed? (nearest percent)		

Solve each problem. Use either an equation or a percent line.

21.	What number is 12% of 6?	22.	6 is what percent of 12?
23.	6 is 12% of what number?	24.	Find 62.5% of 32.
25.	What is 35% of 84?	26.	9 is 2% of what number?
27.	16 is what percent of 5?	28.	What percent of 45 is 18?
29.	21 is what percent of 12?	30.	What percent of 60 is 42?
31.	150 is what percent of 60?	32.	20 is what percent of 50?
33.	What is 8% of 17.5?	34.	What is 37.5% of 300?
35.	Find 87.5% of 100.	36.	Find 6.5% of 250.
37.	39 is 40% of what number?	38.	56 is 1% of what number?
39.	What number is 19% of \$100?	40.	125% of what number is 15?
41.	40% of \$9 is what number?	42.	2 is what percent of 125?

43.	In a Dallas Morning News article it stated: "Online retailers may list prices up to 200 percent lower than college bookstores." Is this reasonable? Why or why not?	
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Solve. Use either a percent equation or a percent line.

1.	Twenty percent of the students in a class have one or more cats as pets. There are six cat owners in the class. How many students are in this class?
2.	Elise earns \$45/week with a part-time job at a local pig farm. She decides to put 30% of this amount in a saving account. How much does she put in the savings account each week?
3.	Caroline conducted a survey of several students in her school. She asked 150 students to name their favorite food. Ninety students named pizza as their favorite food. What percent of students preferred pizza?
4.	The "I Love American Idol" club has 60 members. Twenty-four of the members are younger than 12. What percent of the members are younger than 12?
5.	In Grapevine, 75% of the parks have tennis courts. If 18 parks have tennis courts, how many parks does Grapevine have altogether?
6.	There are 275 sixth graders at DIS. A survey shows that 64% of them think Mrs. Bailey is weird. How many DIS sixth graders think Mrs. Bailey is weird?
7.	In the Dragon Apartments 35% of the apartments have one bedroom. If there are 63 one bedroom apartments, what is the total number of Dragon Apartments?
8.	Vijay received a score of 96% on his math test. If he correctly answered 24 problems, how many questions were on the test?
9.	Your dinner last night contained 6 grams of fat, which is 8% of the daily value recommended by the U.S. Food and Drug Administration. How many grams of fat are recommended for a normal diet?
10.	Landon wants to buy a new baseball cap. He finds one that normally sells for \$17.99 on sale for 20% off. Find the discount to the nearest cent.
11.	Chris wants to buy an iPod Nano. The original price was \$79 and it is on sale for 10% off. Chris has an additional coupon for 25% off the purchase of any sale item at the store. What is the price of the iPod after both discounts are applied (to the nearest cent)?
12.	A television set that regularly costs \$250 is advertised on sale at a 15% discount. A week later it is further reduced by 10% of the discounted price. Find a single discount that is equivalent to these two successive discounts.

BEST BUY: 20% off games \$30 or less / 30% off games over \$30 We accept all manufacturer's coupons

GAMESTOP: 50% off all games No coupons allowed

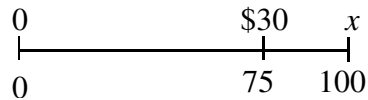
Mr. Mangham wants to buy three games: \$19.99, \$54.99, and \$35.99 and he has a coupon for 25% off.

13.	Make a prediction as to which store you think was offering the best deal. Explain your prediction.
14.	Solve with a percent line or an equation to determine how much each of the three games will cost at each store. Which store offers the better deal?
15.	While shopping at Walmart, Mr. Mangham found another game for a sale price of \$23.99 which had been discounted 25%. What was the original price of the game?

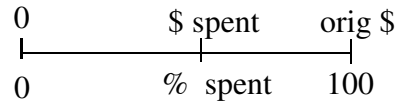
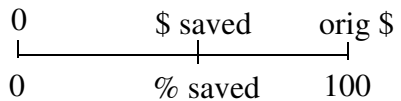
All sales and discounts can be calculated by creating either an equation or a percent line. The trickiest one is when the percent savings and the new price are given to you. See the example below:

Example: Tara bought a new coat which was on sale for \$30, which was 25% off the original price. What was the original price?

Since the \$30 is how much she paid, it is equivalent to 75% of the original price (because she saved 25%). Therefore, the equation would be: $0.75 \bullet x = \$30$. A percent line would be setup as:



Your percent line will always be set up in one of two ways:



Complete the table below. Find the missing numbers by using either an equation or a percent line.

	Original Price	Today's deal (% saved)	Savings (\$ saved)	Percent Spent	New Price (\$ Spent)
1.	\$85.00	70% off			
2.		65% savings	\$19.50		
3.	\$120.00				\$72.00
4.	\$45.00		\$11.25		
5.			\$22.00		\$28.00
6.		15% discount			\$34.00
7.	\$92.00	30% off			
8.		20% discount			\$105.00
9.		75% savings	\$1.80		
10.	\$23.70				\$18.96
11.	\$60.00		\$25.20		
12.		90% off			\$60.00
13.	\$120.00	15% off			
14.		35% discount			\$45.50
15.		80% discount	\$40.00		
16.	\$800.00				\$100.00

$$\text{Percent Change} = \frac{\text{Change}}{\text{Original}} \times 100$$

$$\text{Percent Increase} = \frac{\text{New Price} - \text{Old Price}}{\text{Old Price}} \times 100$$

$$\text{Percent Decrease} = \frac{\text{Old Price} - \text{New Price}}{\text{Old Price}} \times 100$$

Example On the first Monday of school, eight students in Mr. Mangham's homeroom thought math homework was important. After doing homework and getting excellent grades on their first test, 20 of the students now thought math homework was important. Find the percent increase.

$$\begin{aligned} \text{percent of change} &= \frac{20 - 8}{8} = \frac{12}{8} \\ &= 1.5 \text{ or } 150\% \end{aligned}$$

Step 1: Find the amount of change.

Step 2: Find the new amount by adding the amount of change to the original amount.

Find each percent of change. Describe the percent of change as a percent of increase or a percent of decrease. If necessary, round to the nearest tenth of a percent.

1.	\$20 to \$25		2.	5 ft. to 4 ft.	
3.	20 mi/hr to 35 mi/hr		4.	12 cm to 6 cm	
5.	\$2.50 to \$7.50		6.	120 lb to 132 lb	
7.	\$96 to \$147		8.	144 lb to 168 lb	
9.	18.5 ft to 22.2 ft		10.	\$48 to \$42	
11.	\$4 to \$4.44		12.	20 students to 30 students	
13.	\$400 to \$380		14.	\$65 to \$50	
15.	\$140 to \$100		16.	From 16 bagels to 0 bagels	

17.	The grizzly bear population in Yellowstone National Park in 1970 was about 270. Over the next 35 years, it increased by about 115%. What was the population in 2005?	
18.	A TV has an original price of \$499. Find the new price after a 10% increase.	
	A TV has an original price of \$499. Find the new price after a 30% decrease.	
19.	There were originally 48 cookies. If the next day there was a 25% decrease in cookies, how many cookies were there the next day?	
20.	Mr. Mangham had 810 songs on his iPod last year. This year there is a 130% increase in songs on his iPod. How many songs does he have this year?	
21.	Adam currently runs about 20 miles a week and he wants to increase his weekly mileage by 30%. How many miles will Adam run per week?	
22.	Cheese sticks that were previously priced at "5 for \$1" are now "4 for \$1". Find the percent decrease in the number of cheese sticks you can buy for \$1. Find the percent increase in price per cheese stick.	

Determine the percent change of the 10 stocks that your team has in your portfolio. You will need the original stock prices from your weekly page and the latest Edmodo posting with stock prices as of last Friday.

You may use a calculator to determine the percent change. Round to the nearest hundredth of a percent.

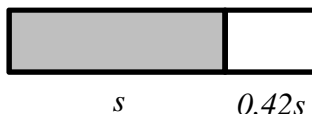
	Company Name	Starting Stock Price	Stock Price as of Last Friday	% Change
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

11.	A stock starts at \$100. In Year 1 the stock gains 50%. In Year 2 the stock decreases 50%. What is the stock price after two years?	
12.	A stock starts at \$50. In Year 1 the stock decreases by 75%. In Year 2 the stock increases by 300%. What is the stock price after two years?	
13.	Find your best stock from your 10 above. Find its stock price 5 years ago and determine the percent change over the last 5 years. You should be able to find a site which has this information by Google searching: What was the price of _____ stock 5 years ago.	
14.	Find your worst stock from your 10 above. Find its stock price 5 years ago and determine the percent change over the last 5 years.	
15.	How do your best and worst stocks compare over the 5 year period?	

Markup is an amount added to the original cost of an item to find the selling price.

To make a profit, stores mark up the prices on the items they sell. A sports store buys skateboards from a supplier for s dollars. What is the retail price for skateboards that the manager buys for \$35 and \$56 after a 42% markup?

Use a bar model. Draw a bar for the cost of the skateboard s . Then draw a bar that shows the markup: 42% of s , or $0.42s$.



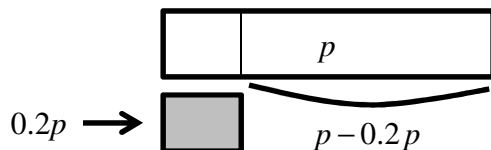
$$\text{Retail price} = \text{Original cost} + \text{Markup} = s + 0.42s = 1.42s$$

$$s = \$35 \longrightarrow \text{Retail Price} = 1.42(\$35) = \$49.70$$

$$s = \$56 \longrightarrow \text{Retail Price} = 1.42(\$56) = \$79.52$$

An example of a percent decrease is a discount, or **markdown**. A price after a markdown may be called a sale price. You can also use a bar model to represent the price of an item including the markdown.

A discount store marks down all of its holiday merchandise by 20% off the regular selling price. Find the discounted price of decorations that regularly sell for \$16 and \$23.



$$\text{Markdown price} = \text{Original cost} - \text{Markdown} = p - 0.2p = 0.8p$$

$$p = \$16 \longrightarrow \text{Markdown Price} = 0.8(\$16) = \$12.80$$

$$p = \$23 \longrightarrow \text{Markdown Price} = 0.8(\$23) = \$18.40$$

Dana buys dress shirts from a clothing manufacturer for s dollars each and then sells the dress shirts in her retail clothing store at a 35% markup.

- Write the markup as a decimal
- Write an expression for the retail price of the dress shirt.
- What is the retail price of a dress shirt that Dana purchased for \$32.00?
- How much was added to the original price of the dress shirt?

List the markup and retail price of each item. Round to two decimal places when necessary.

	Item	Price	Markup %	Markup	Retail Price
1.	Hat	\$18	15%		
2.	Book	\$22.50	42%		
3.	Shirt	\$33.75	75%		
4.	Shoes	\$74.99	33%		
5.	Clock	\$48.60	100%		
6.	Painting	\$185.00	125%		

Find the selling price for each item given the amount paid and the markup or markdown.

Round to the nearest cent.

7.	\$240 grill, 25% markup		8.	\$580 refrigerator, 30% markup	
9.	\$160 microwave, 20% markup		10.	\$150 chair, 35% markup	
11.	\$59.99 shoes, 15% markup		12.	\$99.99 watch, 20% markup	
13.	\$45.00; 22% markdown		14.	\$279.99; 75% markdown	
15.	Find the percent change in price if the old selling price was \$20 and the new selling price is \$15.				
16.	Find the percent change in price if the old selling price was \$13 and the new selling price is \$15.				
17.	A storekeeper pays \$80 for a coat and prices it at a markup of 15%. Later it is marked up an additional 10% of that price. Find a single markup equivalent to these two successive markups.				

18. Mrs. Oliver made price tags for several items that are to be marked down by 35%. Match each Regular Price to the correct Sale Price, if possible. Not all sales tags match an item.

Regular Price \$3.29	Regular Price \$4.19	Regular Price \$2.79	Regular Price \$3.09	Regular Price \$3.77
Sale Price \$2.01	Sale Price \$2.45	Sale Price \$1.15	Sale Price \$2.72	Sale Price \$2.24