

# UNIT 9 2015-16

## PERCENTS AND MEASUREMENT CONVERSIONS

### CCM6+

Name: \_\_\_\_\_

Math Teacher: \_\_\_\_\_

Projected Test Date: \_\_\_\_\_

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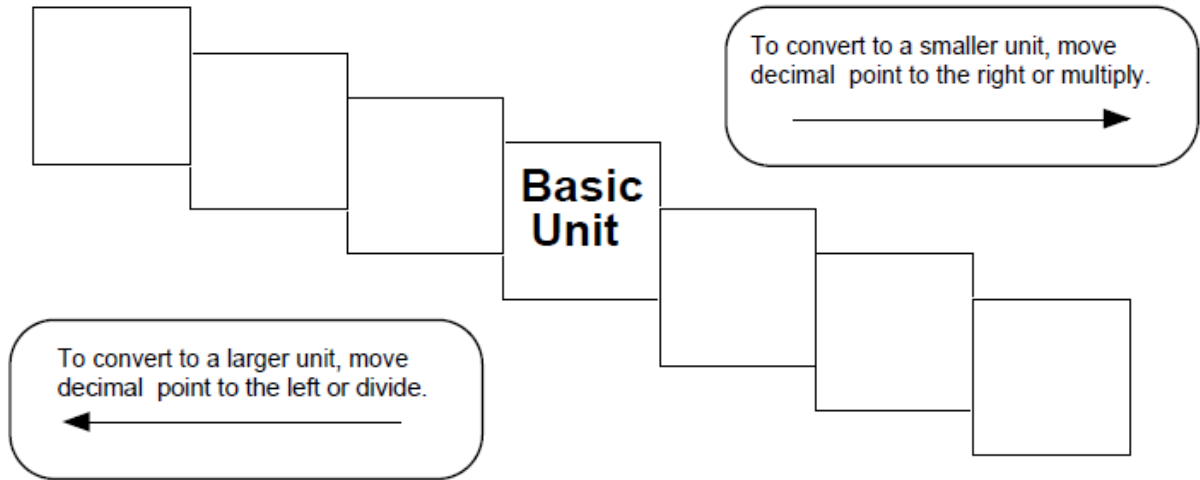
## Unit 9 Vocabulary

balance	the principal plus the interest
cent	a cent is equivalent to 1/100 of a dollar in US circulation
Commission	A fee paid for services, usually a percentage of the total cost.
Customary System	A system of measurement used in the U.S. The system includes units for measuring length, capacity, and weight.
discount	the amount of decrease in price
interest (i)	an amount that is collected or paid for the use of money
markup	the amount of increase in price
Metric System	A system of measurement based on tens. The basic unit of capacity is the liter. The basic unit of length is meter. The basic unit of mass is the gram.
percent	ratio that compares a number to 100
percent error	percentage value that tells how close or how far off a measured (experimental) value is from the predicted (accepted) value
percent of change	an amount, stated as a percent, that a number increases or decreases
predicted value	the value in a situation that is the real, accepted, and true value
principal (p)	the amount of money deposited, borrowed, or invested
simple interest	the formula to calculate simple interest is $i = prt$ , where $i$ is the interest, $p$ is the principal, $r$ is the interest rate per year, and $t$ is the time in years
Tax	a percent of the cost of an item added to the initial bill
time (t)	time, in years, that the money earns interest
Tip	the amount of money added to a bill for service; usually a percent of the bill

**Use Equivalent Ratios to Convert within the Metric System**

***Metric Mania***  
***Conversion Practice***

Name \_\_\_\_\_



**Try these conversions, using the ladder method.**

1000 mg = \_\_\_\_\_ g

1 L = \_\_\_\_\_ mL

160 cm = \_\_\_\_\_ mm

14 km = \_\_\_\_\_ m

109 g = \_\_\_\_\_ kg

250 m = \_\_\_\_\_ km

**Compare using <, >, or =.**

56 cm ○ 6 m

7 g ○ 698 mg

HW:

## Metric Mania

Name \_\_\_\_\_

### Conversion Challenge

Write the correct abbreviation for each metric unit.

1) Kilogram \_\_\_\_\_

4) Milliliter \_\_\_\_\_

7) Kilometer \_\_\_\_\_

2) Meter \_\_\_\_\_

5) Millimeter \_\_\_\_\_

8) Centimeter \_\_\_\_\_

3) Gram \_\_\_\_\_

6) Liter \_\_\_\_\_

9) Milligram \_\_\_\_\_

Try these conversions, using the ladder method.

1) 2000 mg = \_\_\_\_\_ g

6) 5 L = \_\_\_\_\_ mL

11) 16 cm = \_\_\_\_\_ mm

2) 104 km = \_\_\_\_\_ m

7) 198 g = \_\_\_\_\_ kg

12) 2500 m = \_\_\_\_\_ km

3) 480 cm = \_\_\_\_\_ m

8) 75 mL = \_\_\_\_\_ L

13) 65 g = \_\_\_\_\_ mg

4) 5.6 kg = \_\_\_\_\_ g

9) 50 cm = \_\_\_\_\_ m

14) 6.3 cm = \_\_\_\_\_ mm

5) 8 mm = \_\_\_\_\_ cm

10) 5.6 m = \_\_\_\_\_ cm

15) 120 mg = \_\_\_\_\_ g

Compare using <, >, or =.

16) 63 cm ○ 6 m

17) 5 g ○ 508 mg

18) 1,500 mL ○ 1.5 L

19) 536 cm ○ 53.6 dm

20) 43 mg ○ 5 g

21) 3.6 m ○ 36 cm

## Converting between Customary Measures using Equivalent Ratios

WARMUP:

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### Fruit and Vegetables

This problem gives you the chance to:

- work with units of weight in the customary system
- 



16 ounces = 1 pound

Jeff likes cooking with fruit and vegetables.

He needs to know how much they weigh.

This is what he found:

A tomato weighs between 1 ounce and 4 ounces.

An apple weighs between 4 ounces and 8 ounces.

A kiwi fruit weighs between 2 ounces and 4 ounces.

A banana weighs between 3 ounces and 6 ounces.

A carrot weighs between 2 ounces and 5 ounces.

A grape weighs between  $\frac{1}{4}$  ounce and 1 ounce.

An orange weighs between 5 ounces and 10 ounces.

A plum weighs between 1 ounce and 3 ounces.

Use this list to answer the questions on the next page.

**Warmup Cont'd**

1. Jeff buys 4 apples.  
What is the least amount they can weigh? \_\_\_\_\_ ounces

Explain your answer.

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2. Jeff buys 6 plums.  
What is the greatest amount they can weigh? \_\_\_\_\_ pound \_\_\_\_\_ ounces

3. Jeff buys 4 bananas and 5 carrots and 2 tomatoes.  
What is the least amount they can weigh in all? \_\_\_\_\_ pound \_\_\_\_\_ ounces

Show how you figured it out.

4. Jeff buys half a pound of grapes.  
What is the greatest number of grapes he can get? \_\_\_\_\_

Explain how you got your answer.

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**MEASURES Within the CUSTOMARY SYSTEM**

<p><b>Customary Units of Length</b></p> <p>1 foot (ft) = _____ inches (in)</p> <p>1 yard (yd) = _____ ft = _____ yd</p> <p>1 mile (mi) = _____ ft = _____ yd</p>	<p><b>Customary Units of Weight</b></p> <p>1 pound (lb) = _____ ounces (oz)</p> <p>1 ton = _____ lbs = _____ oz</p>
<p><b>Customary Units of Capacity</b></p> <p>1 cup (c) = _____ fluid ounces (fl oz)</p> <p>1 pint (pt) = _____ c = _____ fl oz</p> <p>1 quart (qt) = _____ pt = _____ c = _____ fl oz</p> <p>1 gallon (gal) = _____ qt = _____ pt = _____ c = _____ fl oz</p>	<p>What tricks have you learned in the past to help you remember these?</p>

12 in = 1 ft	16 oz = 1 lb	2 c = 1 pt
3 ft = 1 yd	2000 lb = 1 t	2 pt = 1 qt
		4 qt = 1 gal

You can use equal ratios to convert between customary problems....

**Example #1:**

72 in = \_\_\_\_\_ yd

÷ 2

⇒

Set up 2 equal ratios:  $\frac{72 \text{ in}}{\text{yd}} = \frac{36 \text{ in}}{1 \text{ yd}}$

⇐

Work it out!  $\cdot 2$

**Example #2:**

12 qt = \_\_\_\_\_ gal

⇒

Set up 2 equal ratios:  $\frac{12 \text{ qt}}{\text{gal}} = \frac{4 \text{ qt}}{1 \text{ gal}}$

⇐

•••  
7

**Day 7: Practice with Converting Customary Measures....Set up two equal ratios!**

**1a. 10 T = \_\_\_\_\_ lb**  
 $\frac{1 \text{ T}}{2000 \text{ lb}} = \frac{10 \text{ T}}{?}$

**1b. 4 mi = \_\_\_\_\_ ft**

**2a. 32 oz = \_\_\_\_\_ qt**

**2b. 128 oz = \_\_\_\_\_ qt**

**3a. 14 C = \_\_\_\_\_ pt**

**3b. 112 oz = \_\_\_\_\_ lb**

**4a. 2,000 lb = \_\_\_\_\_ T**

**4b. 1 lb = \_\_\_\_\_ oz**

**5a. 56 oz = \_\_\_\_\_ C**

**5b. 1 mi = \_\_\_\_\_ ft**

**6a. 4 gal = \_\_\_\_\_ oz**

**6b. 4 gal = \_\_\_\_\_ qt**

**7a. 132 in = \_\_\_\_\_ ft**

**7b. 144 in = \_\_\_\_\_ ft**

**8a. 7 T = \_\_\_\_\_ lb**

**8b. 3 mi = \_\_\_\_\_ ft**

**9a. 2 mi = \_\_\_\_\_ ft**

**9b. 8,000 lb = \_\_\_\_\_ T**



## Converting between Metric and Customary

Set up two equal ratios and find the missing piece. Use the conversion charts below.

### METRIC to CUSTOMARY:

Metric Units	Customary Units
1 centimeter	0.394 inch
1 meter	3.281 feet or 1.093 yards
1 kilometer	0.621 mile
1 gram	0.035 ounce
1 kilogram	2.205 pounds
1 milliliter	0.034 fluid ounce
1 liter	1.057 quart or 0.264 gallon

### CUSTOMARY to METRIC:

Customary Units	Metric Units
1 inch	2.54 centimeters
1 foot	30.48 centimeters or 0.3048 meter
1 yard	0.914 meter
1 mile	1.609 kilometers
1 ounce	28.350 grams
1 pound	454 grams or 0.454 kilogram
1 fluid ounce	29.574 milliliters
1 quart	0.946 liter
1 gallon	3.785 liters

Now, let's try some:

- a) 5 inches = \_\_\_\_\_ cm \*We are converting from inches to cm so use the chart on the \_\_\_\_\_.

$$\frac{1 \text{ inch}}{2.54 \text{ cm}} = \frac{5 \text{ inches}}{x}$$

- b) 8 km = \_\_\_\_\_ mi \*We are converting from km to mi so use the chart on the \_\_\_\_\_.

$$\frac{1 \text{ km}}{0.621 \text{ mi}} = \frac{8 \text{ km}}{x}$$

- c) 18 g = \_\_\_\_\_ oz \*Use the chart to the \_\_\_\_\_.

$$\text{_____} = \text{_____}$$

- d) 3.5 qt = \_\_\_\_\_ L \*Use the chart to the \_\_\_\_\_.

$$\text{_____} = \text{_____}$$

**HW**

**METRIC to CUSTOMARY:**

Metric Units	Customary Units
1 centimeter	0.394 inch
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**CUSTOMARY to METRIC:**

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1 quart	0.946 liter
1 gallon	3.785 liters

1) 16 in = \_\_\_\_\_ cm      2) 345 lb = \_\_\_\_\_ kg      3) 56 g = \_\_\_\_\_ oz

4) 450 km = \_\_\_\_\_ mi      5) 1200 mL = \_\_\_\_\_ fl oz      6) 40 m = \_\_\_\_\_ ft

7) Penny has a pencil that is 19 cm long. How long is this pencil in inches?

8) A cookie recipe (1 batch) calls for 1 lb of butter. How many grams of butter would be in 3 *batches*?

Name \_\_\_\_\_

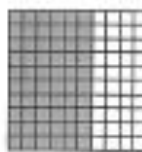
CLASSWORK

## Understanding Percent

A percent is a ratio that compares a part to a whole.  
 The second term in the ratio is always 100.  
 The whole is 100%.  
 The grid has 60 of 100 squares shaded.

$$\frac{60}{100} = 60\%$$

So, 60% of the grid is shaded.



When the second term of a ratio is not 100, you can write an equivalent ratio with a denominator of 100 or use a proportion to find the percent shown by the part.



$$\frac{1}{10} = \frac{10}{100} = 10\% \text{ or } \frac{1}{10} = \frac{x}{100}$$

$$10x = 100$$

$$x = 10$$

So, 10% of the circle is shaded.

The line segment represents 100%.  
 What percent is shown by Point A?



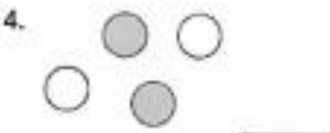
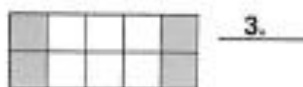
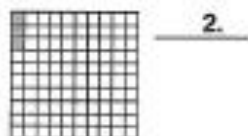
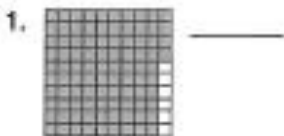
$$\frac{2}{5} = \frac{40}{100} = 40\% \text{ or } \frac{2}{5} = \frac{x}{100}$$

$$5x = 200$$

$$x = 40$$

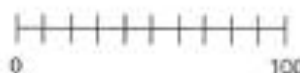
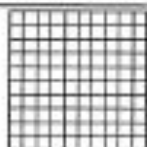
So, 40% of the line segment is shaded.

Write the percent of each figure that is shaded.



7. **Number Sense** Jana divided a sheet of paper into 5 equal sections and colored 2 of the sections red. What percent of the paper did she color? \_\_\_\_\_

8. **Writing to Explain** Shade each model to show 100%. Explain how you knew how many parts to shade.

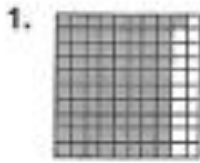


Name \_\_\_\_\_

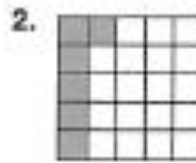
HOMEWORK

# Understanding Percent

Write the percent of each figure that is shaded.



\_\_\_\_\_



\_\_\_\_\_

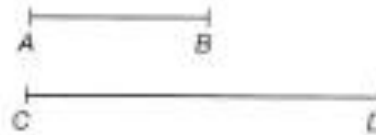


\_\_\_\_\_



\_\_\_\_\_

5. **Number Sense** What percent of line segment  $AB$  is equal to 50% of line segment  $CD$ ?

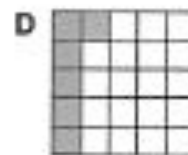
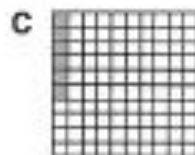
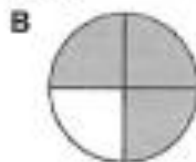


\_\_\_\_\_

6. The line segment below shows 100%. Show 25%, 50%, and 75% of the segment.



7. Which of the following figures is 60% shaded?



8. **Writing to Explain** You are thirsty, so a friend has offered to give you 50% of his water. What information must you have in order to find out how much water your friend will give you?

\_\_\_\_\_  
\_\_\_\_\_

## Converting between percents, fractions and decimals

Percent to Decimal	Examples
<p>To convert a percent to a decimal, just divide by 100...or move the decimal place two to the left.</p> <p>*In a decimal, the point is after the _____place.</p> <p>**In a percent, the point is after the _____place.</p>	<p>1) 50% = _____</p> <p>2) 82% = _____</p> <p>3) 12.5% = _____</p> <p>4) 101% = _____</p> <p>5) Why is it okay to have a percent over 100% ?</p>
Decimal to Percent	Examples
<p>To move the decimal from the ones place to the hundredths place, either:</p> <p>1) move the decimal 2 places right (so it is after the _____ place).</p> <p>2) multiply by 100 to move the decimal two places right.</p>	<p>1) 0.22 = _____%</p> <p>2) 0.2 = _____%</p> <p>3) 2.0 = _____%</p>
Percent to Fraction	Examples
<p>Since a percent is a value out of 100, type it in as a fraction over 100 and hit enter. Or put it over 100 and simplify like normal.</p>	<p>1) 32% = _____</p> <p>2) 8% = _____</p> <p>3) 125% = _____</p>
Fraction to Percent	Examples
<p>To turn a fraction into a percent, simply multiply by 100. Or make an equal ratio that has a denominator of 100.</p>	<p>1) <math>\frac{3}{5}</math> = _____%</p> <p>2) <math>\frac{3}{4}</math> = _____%</p> <p>3) <math>1\frac{7}{10}</math> = _____%</p>

If your answer is a percent, you must put the percent symbol!



**Understand Percents**

WARMUP: Use your calculator to find the percents.

**PURPOSEFUL PERCENTS**

**Find the following benchmark percentages. Use these percentages to calculate the remaining percentages.**

<b>100%</b>	<b>50%</b>	<b>25%</b>	<b>10%</b>	<b>5%</b>	<b><math>2\frac{1}{2}\%</math></b>	<b>1%</b>
<b>\$28</b>						

- A. 60% of \$28 = \_\_\_\_\_**      **B. 30% of \$28 = \_\_\_\_\_**
- C. 75% of \$28 = \_\_\_\_\_**      **D. 15% of \$28 = \_\_\_\_\_**
- E. 9% of \$28 = \_\_\_\_\_**      **F. 95% of \$28 = \_\_\_\_\_**
- G.  $7\frac{1}{2}\%$  of \$28 = \_\_\_\_\_**      **H. 150% of \$28 = \_\_\_\_\_**

**Class Problem**

There are 1200 students at Start Middle School.

- How many students make up 1% of the student body?
- How many students make up 10% of the student body?
- How many students make up 25% of the student body?
- If 30% of the students are 7<sup>th</sup> graders, how many 7<sup>th</sup> graders are there?
- If 27% of the students play a school sport, how many students play school sports?
- If 84% of the students bought a school yearbook, how many yearbooks were purchased?

### Percent-Find the Missing Part

Use equivalent ratios to find the whole, given a part and the percent.

**54 is 60% of what number?**

**Step 1** Write the relationship among the percent, part, and whole.

The percent is 60%. The part is 54. The whole is unknown.

$$\text{Percent} = \frac{\text{part}}{\text{whole}}$$

$$60\% = \frac{54}{x}$$

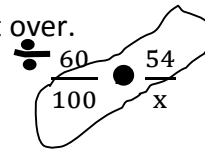
↑ is  
 ↓ of

**Step 2** Write the percent as a ratio.

$$\frac{60}{100} = \frac{54}{x}$$

**Step 3** Cross-multiply the numbers on the cross and divide by the number left over.

$$100 \cdot 54 \div 60 = \underline{\hspace{2cm}}$$



**So, 54 is 60% of \_\_\_\_\_.**

**Find the unknown value.**

1. 12 is 40% of \_\_\_\_\_      2. 15 is 25% of \_\_\_\_\_      3. 24 is 20% of \_\_\_\_\_

4. 36 is 50% of \_\_\_\_\_      5. 4 is 80% of \_\_\_\_\_      6. 12 is 15% of \_\_\_\_\_

7. 90% of 80 is \_\_\_\_\_      8. 75% of 12 is \_\_\_\_\_      9. 30% of 27 is \_\_\_\_\_

10. 18% of 50 is \_\_\_\_\_      11. 22% of 99 is \_\_\_\_\_      12. 45% of 90 is \_\_\_\_\_



## Percent Calculations (A)

Calculate the percent or value requested.

1. What is 93% of 600?
2. What percent of 825 is 627?
3. 6 is 15% of what amount?
4. 368 is 64% of what amount?
5. 3 is 1% of what amount?
6. What percent of 350 is 252?
7. What percent of 100 is 79?
8. What percent of 925 is 37?
9. 247 is 38% of what amount?
10. What is 78% of 550?

## Percent Calculations (B)

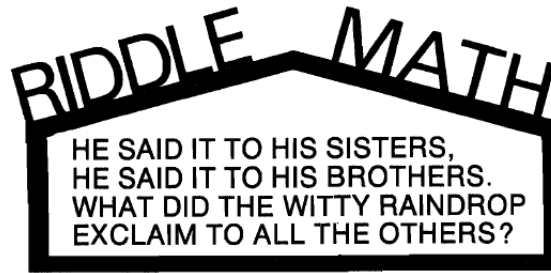
Calculate the percent or value requested.

1. 486 is 60% of what amount?
2. What percent of 800 is 712?
3. What is 65% of 960?
4. 11 is 11% of what amount?
5. 624 is 65% of what amount?
6. What is 66% of 250?
7. 552 is 69% of what amount?
8. What is 84% of 1,000?
9. What percent of 275 is 121?
10. 429 is 78% of what amount?

**Percent Applications with Tips/Discounts/Taxes**

COMMON APPLICATIONS WITH PERCENTS...USE a CALCULATOR!

<b>Big Idea</b>	<b>What is it?</b>	<b>Problem</b>	<b>Solution</b>
<b>TAX</b>	TAX \$ is _____ to the final price.	You go to the store and buy a pair of jeans that cost \$32.59. Sales tax in Raleigh, NC is 6.75%.  a) How much extra will you pay in tax?  b) What is your final price to pay?	a)    b)
<b>TIP</b>	TIP \$ is _____ to the final bill.	You go out to Buffalo Brothers for dinner with a few friends. Your bill (including tax) is \$28.73. You want to leave a 20% tip.  a) What is your tip \$?  b) What is your total cost?	a)    b)
<b>DISCOUNT</b>	DISCOUNT means there is a _____ so you _____ the \$ from the price.	Hooray! American Eagle is having a sale on jeans! All pairs are 25% off! If jeans regularly cost \$39.95, what will you pay for a pair of jeans?  a) How much \$ is taken off due to the discount?  b) What will you pay?	a)    b)
<b>mixed</b>	In reality, sometimes there are DISCOUNTS and you still have to pay TAX— this stuff combines in real life!	Bath and Body works is having a 35% off sale on Tervis cups. Normally they cost \$18.95. a) What is the discount?  b) What is the sale price?  c) If sales tax is 6.75%, what will you pay in taxes?  d) What is your final cost?	a)    b)    c)    d)



**DIRECTIONS:**

Use the information given in the chart to figure out the missing values, each of which is indicated by a letter. Round the values to the nearest cent. Find each answer in the code and write the corresponding letter above it.

ARTICLE ON SALE	ORIGINAL PRICE	PERCENT DISCOUNT	SALE PRICE	PERCENT SALES TAX	TOTAL AMOUNT
WATCH	\$50	10%	D	6%	H
CALCULATOR	\$45	25%	E	4%	Y
BICYCLE	\$110	20%	U	5%	N
TYPEWRITER	\$99.00	15%	W	6%	S
TENNIS RACKET	\$59.90	10%	M	4%	R
TURNTABLE	\$88.50	30%	A	5½%	P
CAMERA	\$78	33⅓%	L	4½%	T
CASSETTE DECK	\$84.95	40%	O	5%	C

THE WITTY RAINDROP SAID:

\$54.34 \$84.15 \$50.97 \$89.20 \$53.52 \$50.97 \$53.91 \$65.36 \$61.95 \$92.40 \$35.10

\$61.95 \$92.40 \$45 \$54.34 \$47.70 \$56.07 \$33.75 \$33.75 \$89.20

\$61.95 \$53.52 \$52 \$50.97 \$88 \$45

### Mark Up and Discount Homework

**Find each Mark Up. Round to nearest 100<sup>th</sup> when necessary.**

- |                                      |                                    |  |                                       |
|--------------------------------------|------------------------------------|--|---------------------------------------|
| 1. Cost: \$1.50<br>% of mark up: 70% | 2. Cost: \$38<br>% of mark up: 58% | 3. Cost: \$111.00<br>% of mark up: 50% | 4. Cost: \$18.00<br>% of mark up: 35% |
|--------------------------------------|------------------------------------|--|---------------------------------------|

5. A beach store pays \$11.40 for each beach umbrella. The store's percent of mark up is 75%. What is the mark up?

6. A clothing store pays \$56 for a jacket. The store's percent of mark up is 75%. What is the mark up?

**Find each Discount. Round to nearest 100<sup>th</sup> when necessary.**

- |  |   |   |                                     |
|--|---|---|-------------------------------------|
| 7. Regular price: \$100<br>price: \$8.49<br>% of discount: 27% | 8. Regular price: \$24.50<br>% of discount: 20% | 9. Regular price: \$700<br>% of discount: 30% | 10. Regular<br>discount: 5%<br>% of |
|--|---|---|-------------------------------------|

11. An \$11 shirt is on sale for 10%. What is the discount?

12. A video store's regular price of a video is \$25.95, and it's on sale for 20% off. What is the discount?

**Vocabulary:**

~ **Sales Tax:** An amount of money added to a total purchase determined by the county and state in which the purchase is made.

~ **Tip:** The amount of money earned by a person in the service industry for providing a particular service. Tips usually given to waiters, valet, caddies, drivers and bellboys.

~ **Commission:** The amount of money earned by a salesperson for selling a certain product.

~ **Discount:** An amount subtracted from the price of an item; a savings.

**Match the term to the example:**

- |  |               |
|--|---------------|
| _____ 1) Uncle Johnny gave his waiter \$20.  | a) Sales Tax  |
| _____ 2) Elvis got an extra \$45 in his paycheck from his sales this week.                     | b) Tip        |
| _____ 3) Mike used a coupon and only spent \$13 instead of \$22.                               | c) Commission |
| _____ 4) Even though I bought \$10 worth of pencils, I had to pay \$10.88.                     | d) Discount   |
| _____ 5) Kent carried my bags up to my hotel room so I gave him \$5.                           |               |
| _____ 6) Joyce bought a sequin top for 20% off.  |               |
| _____ 7) Tommy made \$340 plus his salary because he rented out a lot of apartments this week. |               |

- \_\_\_\_\_ 8) Porsche ordered three pairs of shoes for \$20 each and was charged \$65.25.
- \_\_\_\_\_ 9) Phil only pays 50% because he is an employee.
- \_\_\_\_\_ 10) Will got to take home 20% of the value of his table's check.

**Find the following:**

- 11) Sal spent \$6 out of \$12. What percent of his money did he spend? \_\_\_\_\_
- 12) Todd had \$44 in his wallet. He spent 30% of his money. How much money does he have left? \_\_\_\_\_
- 13) Peter spent 20% of his money. He has \$40 left in his pocket. How much did he go out with? \_\_\_\_\_

**Day 1 – Homework**

**Match the term to the example:**

- |  |               |
|--|---------------|
| _____ 1) Sal only pays 80% of the bill because he counts the money.                                    | a) Sales Tax  |
| _____ 2) Todd will bring your popcorn and drinks faster if you give him money.                         | b) Tip        |
| _____ 3) Dave has to write a check to the State for the amount of money he collects over the subtotal. | c) Commission |
| _____ 4) Drew's boss gave him an extra \$200 for having the highest sales.                             | d) Discount   |
| _____ 5) Wendy will let you stay at the hotel for 20% less if you say "sunshine" when you book.        |               |
| _____ 6) Justin makes 10% of the waiter's money because he bussed their tables and filled the ice.     |               |
| _____ 7) The couple left Lynda a penny on a \$300 bill because she was rude.                           |               |
| _____ 8) Casey paid for a \$2 coffee at the store with a \$5 bill and got back \$2.84.                 |               |

**Solve for the missing number:**

- 9) What is 42% of 87?                      10) 22 is what percent of 88?                      11) 17 is what percent of 51?
- 12) Ramon spent 60% of his \$437 paycheck on gifts for his friends. How much did he spend?
- 13) Jackie kept \$75 out of the \$80 she found on the streets of NYC. What percentage did she keep?
- 14) Hahn had \$25 left in her purse after shopping and spending 20% of her money. How much did she leave to go shopping with?

Name: \_\_\_\_\_

**Percent of a Number Word Problems**

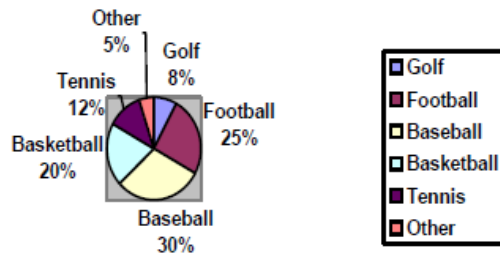
1. George saved 35% of the money he earned. If George earned \$260, how much did he save?
  
2. The seventh grade students at WLMS are going on a field trip. As of today, 85% of the 280 students have turned in their permission slips. How many students have turned in their permission slips?
  
3. The Smith family spent 28% of its monthly income for housing. If the family's monthly income is \$3,200, how much did they spend for housing?
  
4. The frozen yogurt stand in the mall sells 420 yogurt cups per day. Forty-five percent of the cups are sold to middle school students. How many yogurt cups are sold to middle schoolers each day?
  
5. Brenda earned \$120 per week working at a part-time job. After taxes, her paycheck is only 78% of what she earned. What is the amount of Brenda's check?
  
6. Use the chart below. Suppose a secret message contains 1,200 vowels. How many of the vowels are "E"?

Vowel	Occurred (%)
A	25%
E	30%
I	20%
O	20%
U	5%

7. Jerry took a test with a total of 50 questions. His teacher told him that he must answer 90% of the questions correctly to earn an A. How many questions must he answer correctly to earn the A?
  
8. A glass of orange juice has 30% of the total daily allowance of calcium. The total daily allowance of calcium is 1,200 milligrams. How much calcium does a glass of orange juice have?

**ANSWERS:** 1) \$91 2)238 3)\$896 4)189 5)\$93.60 6)360 7)45 8)360 mg

9. Luis needs \$45 to buy his mother a birthday present. He has saved 22% of the amount so far.
- How much has he saved?
  - How much more does he need?
10. The student population at WLMS is 52% female. The total student population is 1,225 students.
- How many girls go to WLMS?
  - How many boys go to WLMS?
11. Lisa spent \$18.95 on her lunch. **About**, how much money she should leave for a 20% tip?
12. In a survey, 500 teenagers were asked to name their favorite sport to watch on television. How many chose:



- Basketball:
  - Golf:
  - Football:
13. The dinner bill for the Johnson family was \$58. Mr. Johnson left a tip of 15% of the bill.
- What was the tip?
  - What was the total cost of the family's dinner?
14. A dress is regularly priced at \$120, and it is marked 20% off the regular price.
- What is the amount of savings, or the amount that the dress was marked down?
  - What was the new price for the dress?

**ANSWERS:** 9) a=\$9.90 b=\$35.10 10)637g and 588 b 11)~\$4 12)a=100 b=40 c=125 13)a=\$8.70 b=\$66.70  
14)a=\$24 b=\$96



# Simple Interest

## Interest Formula

$$I = Prt$$

I = Interest

P = Principal – Starting Amount

r = rate – Percentage **converted into a decimal**

t = time – amount in years

B = Balance = all \$ combined (principal + interest)

Meghan put \$240 in a savings account at 5% interest per year. How much money will Meghan have at the end of one year?



Ellis needed a loan to purchase a car. He went to the bank and asked for \$10,000. The bank gave Ellis the money at a rate of 6.5% simple interest for 4 years. How much interest will Ellis have to pay the bank?

Remember...“I is perty!”

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Simple Interest Worksheet

Find the final balance for each account. Round your answers to the nearest cent.

1. \$800 at 4.25% simple interest for 6 years
2. \$250 at 5% simple interest for 3 years
3. \$900 at 8% simple interest for 1 year
4. \$1,250 at 5% simple interest for 2 years
5. \$1,750 at 5% simple interest for 6 months
6. \$2,000 at 6% simple interest for 3 years
7. \$5,000 at 5% simple interest for 60 months
8. \$6,000 at 5% simple interest for 18 months

## Simple Interest Worksheet - Part 2

1. What is the interest earned on \$350.00 invested 4 years at a 5% simple interest?
2. If I put \$1500 into my savings account and earned \$180.00 of interest at 4% simple interest, how long was my money in the bank?
3. What would my final balance be if I put \$650 in the bank for 60 months with an interest rate of 6%?
4. David invested \$1000.00. What would that money grow to in 18 months at a 5.5% interest rate?
5. My final balance after 48 months was \$896.00. If I originally put \$800.00 into the bank, what was the interest rate?
6. How long would it take me to earn \$139.50 of interest at a 6% interest rate if I started with \$930.00?

## Percent of Change Application

Review: ways to find percent change	1) set up proportion 2) divide then convert to percentage
Review: percent problems	1) missing the part 2) missing the whole 3) missing the percent *Most of the questions will relate to percent problems also*
Example 1	<p>What is the total cost of an item that is marked \$20.00 if the sales tax is 8%?</p> <p>Tax means increase. To solve this problem, we first need to find what 8% of \$20 is. We can use either method to solve.</p> <p><math>x = 1.6</math>, which means \$1.60.</p> <p>The total cost is <math>\\$20 + \text{tax } (\\$1.60) = \\$21.60</math>.</p>
Example 2	<p>A sweater is 30% off and the sale price is \$49. How much is the original price of the sweater?</p> <p>For this problem, we need to find the original price which is missing the whole. Again, there are different ways to solve, but I would use a proportion. Since the sale price is how much we actually paid, then \$49 = 70% of the original. 30% off means we are taking 30% away and still paying 70%. <math>\frac{70}{100} = \frac{49}{x}</math>, and <math>x = \\$70</math>. Does it make sense that our original price would be more than \$49? Why?</p>
Example 3	<p>The price of a gallon of gasoline increased from \$2.50 a gallon to \$2.75 a gallon. What was the percent of increase?</p> <p>This is an example of missing the percent. No matter what method, we still have to find how much the amount changed from \$2.50 to \$2.75. The amount of change is \$.25.</p> <p>After solving a proportion or fraction, make sure the answer is in percent form. <math>\frac{.25}{2.50} = \frac{x}{100} \rightarrow x = 10\%</math> increase.</p>

**DO THE DOO...Difference Over Original • 100!**

The average size of Mrs. Townsend's math classes has increased from 26 to 30 over the past 15 years. What is the percent of change?

Name: \_\_\_\_\_

**DOLLARS AND (PER)CENTS: PERCENT OF CHANGE**

**Whether it's a new CD, a slick pair of sneakers, or that really cool sweater at the Gap, there's always something to buy - especially if it's on sale! Just how much can you save? A lot! Just take this percent of change test and get the lowdown on markdowns!**

1. At Target, a shirt that costs \$25 goes on sale for \$15. What is the percent of decrease in the price?
  
2. A \$40 autographed and framed poster of the Spice Girls goes up in price to \$50. What is the percent of increase in the price?
  
3. Thirty people are shopping in a CD store. Forty-five minutes later, there are 13 people in the store. What is the percent of decrease in the number of people in the store?
  
4. A liter of Pepsi costs \$1.19 at the corner grocery store. But with a handy coupon, the same liter of soda costs \$1.09. What is the percent of decrease in price?
  
5. A \$400 Sony stereo system goes on sale for \$240. What is the percent of decrease in the stereo system's price?
  
6. A pair of sneakers, regularly priced at \$84, is on sale for 20% off.
  - a. Discount: \_\_\_\_\_
  
  - b. Sale Price: \_\_\_\_\_
  
7. Your dream CD player is on sale for 20% OFF the original price. If the original price is \$270, what is the sale price? Hint: Find the discount first.
  - a. Discount: \_\_\_\_\_
  
  - b. Sale Price: \_\_\_\_\_

Kuta Software - Infinite Algebra 1

Name \_\_\_\_\_

Percent of Change

Date \_\_\_\_\_ Period \_\_\_\_\_

Find each percent change to the nearest percent. State if it is an increase or a decrease.

1) From 45 ft to 92 ft

2) From 74 hours to 85 hours

3) From 74 ft to 75 ft

4) From 36 inches to 90 inches

5) From 94 miles to 34 miles

6) From 12 ft to 23 ft

7) From 83 hours to 76 hours

8) From 24 grams to 96 grams

9) From 20 tons to 99 tons

10) From 16 tons to 72 tons

11) From 117 minutes to 91 minutes

12) From 188 m to 42 m

13) From 362 m to 156 m

14) From 139 minutes to 385 minutes

15) From \$328 to \$333

16) From 259 hours to 274 hours

17) From 284 grams to 206 grams

18) From \$246 to \$221

19) From 309 grams to 299 grams

20) From 326 ft to 241 ft

21) From 4048 minutes to 7548 minutes

22) From 2150 miles to 7895 miles

23) From 4359 ft to 5377 ft

24) From 5876 m to 6820 m

## PERCENT ERROR NOTES

### HOW TO FIND PERCENT ERROR:

#### METHOD #1:

A certain percent of error is acceptable in industry depending on the product. For example, if a bag of chips is labeled to have 8 ounces, that is your **estimated or predicted amount**. Due to the large volume of bags of chips produced, it is likely that not EVERY bag will weigh exactly 8 ounces. If you were to weigh the actual chips, you may get 8.1 ounces and this would be **your actual value**.

To find the numerator of percent of error, you find the absolute value of the difference between the predicted value or amount and the actual value.

Next you divide by the denominator which is actual value. You will get a decimal outcome.

The last step is to multiply your answer by 100 to change it to a percent. This will be your **percent error**.

#### METHOD #2:

To find the percent of error using proportions you would find the difference between the predicted value or amount and the actual value (subtracting the absolute value of the numbers so that you do not get negatives). This number becomes the numerator of one ratio with the denominator of that ratio being the actual measured value. The second ratio will be % over 100. From here, you cross multiply and solve just like you do for other percent problems.

$$\text{Percent Error} = \frac{|\text{Estimated or Predicted Value} - \text{Actual Value}|}{\text{Actual Value}} \times 100$$

$$\text{OR you could use Percent Error} = \frac{|\text{Experimental (measured) Value} - \text{Accepted (theoretical) Value}|}{\text{Accepted Value}} \times 100$$

**Example:** Joshua uses his thermometer and finds the boiling point of ethyl alcohol to be 75° C. He looks in a reference book and finds that the actual boiling point of ethyl alcohol is 80°C. What is his percent error?

#### METHOD 1

*First identify the predicted value and the actual value. In this case the reference book would be the predicted value and the experiment would give you the actual value. Find the difference:*

$$|75 - 80| = 5$$

*Now set up the difference over the Predicted value and divide to get a decimal:*

$$\frac{5}{80} = 0.0625$$

*Last you multiply by 100 to get your percent error:  $0.0625 \times 100\% = 6.3\%$  rounded to the nearest tenth*

*In the formula it would look like this:*

$$\text{Percent Error} = \frac{|75 - 80|}{80} \times 100\% = \text{about } 6.3\%$$

#### METHOD 2

*First identify the predicted value and the actual value. In this case the reference book would be the predicted value and the experiment would give you the actual value. Find the difference:*

*$80 - 75 = 5$ ; so you use this as the numerator with the original as the denominator*

$$\frac{x}{100} = \frac{5}{80} ; 80x = 100(5) ; 80x = 500 ; x = 6.25 ; \text{so } x \approx 6.3\%$$

**Do the DOA....Difference Over ACTUAL (or accepted)•100.**

**Percent Error Notes**

What is Percent Error?	Percent error is the difference between a predicted (estimated) value and the actual value as a percentage.
Why is percent error important?	Percent error is important because it tells us how right or wrong our prediction or estimate is.
How to calculate percent error?	There are 2 ways to calculate percent error. 1. Proportion 2. Decimal to Percent
Proportion	<p>To calculate the percent error by using a proportion, consider this example:</p> <p>A student made a mistake when measuring the volume of a big container. He found the volume to be 65 liters. However, the real value for the volume is 50 liters. What is the percent error?</p> <p>Set up a proportion to find a percent by starting with x over 100</p> $\frac{x}{100} = \frac{\text{amount of error (subtraction)}}{\text{actual value}}$ <p>To find the amount of error, we need to subtract the measured amount with the actual so <math>65 - 50 = 15</math>. 15 is the numerator and 50 (the real value) is the denominator for the proportion.</p> <p>Solve the proportion to find the percent error is 30%.</p>
Decimal	<p>To calculate the percent error by decimal, first set up a fraction. Consider this example:</p> <p>A man measured his height and found 6 feet. However, after he carefully measured his height a second time, he found his real height to be 5 feet. What is the percent error the man made the first time he measured his height?</p> $\frac{\text{amount of error}}{\text{accepted (or real/actual) value}} = \frac{1}{5}$ <p><math>1/5</math> as a decimal is .20 and then convert to a percent is 20%.</p>



<p>You try one:</p>	<p>I thought 70 people would turn up to the concert, but in fact 80 did! What was my percent error?</p>
<p>Try one more:</p>	<p>The report said the parking lot held 240 cars, but we counted only 200 parking spaces. Find the percent error in the report.</p>
<p>Can you do this one?</p>	<p>What is the percent error of a length measurement of 0.229 cm if the correct value is 0.225 cm?</p>
<p>And one more</p>	<p>I expected to walk 80 km in a day. In fact I walked only 75 km. What was the percentage error?</p>



## Percent Error Practice

Directions: *For each of the following situations find the percent error involved. Be careful in determining the true vs. observed value.*

1. Samantha S. Sloppiness measured the volume of her soda before she drank it for her midmorning snack. She measured the volume of the 12 oz. bottle to be 14 oz.
2. Clyde Clumsy was directed to weigh a 500 g mass on the balance. After diligently goofing off for ten minutes, he quickly weighed the object and reported 458 g.
3. Pretty Patty Pestilence had casually recorded her grades for the nine weeks in her notebook. She concluded she had 250 points out of 300 for the grading period. However, Miraculous (chem teacher) determined she had 225 points out of 300 and awarded her a "C" for the grading period.
4. Drew D. Dingaling came to Miraculous with a problem. Drew was told to measure 50 cm of copper wire to use in an experiment. Since his ruler only measured to 45 cm he used this amount of wire and his experiment was a failure.
5. Henry Heavyfoot was just arrested for speeding by Officer O'Rourke for traveling 65 mph in a 55 mph zone. Henry claimed his speedometer said 55 mph not 65 mph.
6. Willomina Witty was assigned to determine the density of a sample of nickel metal. When she finished, she reported the density of nickel as 5.59 g/ml. However, Miraculous knew the density of nickel was 6.44 g/ml.
7. An experiment to determine the volume of a "mole" of a gas was assigned to Barry Bungleditup. He didn't read the experiment carefully and concluded the volume was 18.7 liters. Miraculous knew he should have obtained 22.4 liters.

**Answers:** 1. 16.6%; 2. 8.40%; 3. 11.1%; 4. 10.0%; 5. 15.4%; 6. 13.2%; 7. 16.5%

**PERCENT APPLICATIONS WORKSHEET –work it out and check it!**

1. Sue answers 42 out of 60 questions correctly. What **percent** of her answers are correct?
2. On a 20-item practice test, how many questions must you answer correctly for a score of 80% correct?
3. A teacher earns \$18,500 per year. If 18% of her income is withheld for taxes, how much money is withheld for taxes? How much of her income is left after taxes?
4. A 25¢ stamp is increased to 30¢. What **percent** of the original price does this increase represent?
5. At \$450 per month, a student pays \$5400 a year in rent. If his annual income is \$15,000, what **percent** of his income is spent on rent?
6. In one state, sales tax is 6%. If sales tax on a car is \$564.00, find the price of the car before tax.
7. Of the 540 seniors at Lake City High School, 35% are going on a school trip. If the buses ordered for the trip seat 42 students, how many buses will be needed so that each student will have a seat?
8. What **percent** was a television set reduced if it was marked \$225 and sold for \$195?

9. During a sale, a shirt was marked down from \$70 to \$56. What was the **percent** decrease?
  
10. If the sales tax rate is 6%, find the tax on a \$429.95 television to the nearest cent.
  
11. A car salesperson advertises 18% off the price of a \$3990.00 Yugo. What would the new price be?
  
12. Barb earns a 26% commission on each lab manual she sells. If she sells 1200 manuals at \$9.95 each, find her commission.
  
13. A boat has a retail price of \$9995.00. If it is on sale for \$8495, what is the **percent** discount to the nearest **percent**?
  
14. A boat on sale last week for \$8495.00 is marked up to \$9995.00. What is the **percent** of price increase to the nearest **percent**?
  
15. A carpet salesperson claims that a carpet on sale for \$12.95 per square yard is 30% off its original price. What was its original price?
  
16. A stereo costs \$418.70, including 6% sales tax. How much was the sales tax itself?

17. Find the annual rate of inflation of a gallon of milk costing \$2.25 last year and \$2.70 this year.
18. To keep pace with a 4% rate of inflation, how much should last year's \$0.37 stamp cost this year?
19. In an election, one candidate claimed 52% of the votes, while the other candidate claimed 2681 votes. If 5000 people voted, how do you know the election results are invalid?
20. If you answered 37 items correctly on a test, and received a score of 74%, how many items were on the test?
21. 85% of the students who take College Algebra pass the course. How many fail out of 140 students?

---

**ANSWERS**

- 1.** 70%   **2.** 16   **3.** \$15,200   **4.** 20%   **5.** 36%   **6.** \$9400   **7.** 5 buses   **8.** 13 1/3%   **9.** 20%
- 10.** \$25.80   **11.** \$3271.80   **12.** \$3104.40   **13.** 15%   **14.** 18%   **15.** \$18.50   **16.** \$23.70
- 17.** 20%   **18.** \$0.26   **19.** The number of votes would total 5281.   **20.** 50   **21.** 21

## CCM6 – Unit 9 (Measurement Conversions/%/% Applications) STUDY GUIDE

### Measurement—metric/customary

- In the space to the right, draw gallon guy.
- Use gallon guy to answer these questions:
  - 8 qt = \_\_\_\_\_ pts
  - 4 gal = \_\_\_\_\_ qts
  - 8 cups = \_\_\_\_\_ pts
- 1 yard = \_\_\_\_\_ feet, and 1 foot = \_\_\_\_\_ inches, so 1 yard = \_\_\_\_\_ inches
- 1 pound = \_\_\_\_\_ ounces, so in 80 ounces there are \_\_\_\_\_ pounds.
- In the space below draw the memory tool to order the metric prefixes (Hint: King Henry....)
- Convert these metric measures using the tool above:
  - 7 mm = \_\_\_\_\_ cm
  - 8 kg = \_\_\_\_\_ g
  - 4.5 cm = \_\_\_\_\_ m

For the problems below, use the charts to the right. It doesn't matter which chart you use!

7. 18 in = \_\_\_\_\_ cm

8. 20 mL = \_\_\_\_\_ fl oz

9. 25 kg = \_\_\_\_\_ lbs

Customary Units	Metric Units
1 inch	2.54 centimeters
1 foot	30.48 centimeters or 0.3048 meter
1 yard	0.914 meter
1 mile	1.609 kilometers
1 ounce	28.350 grams
1 pound	454 grams or 0.454 kilogram
1 fluid ounce	29.574 milliliters
1 quart	0.946 liter
1 gallon	3.785 liters

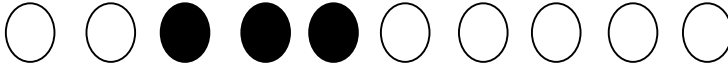
Metric Units	Customary Units
1 centimeter	0.394 inch
1 meter	3.281 feet or 1.093 yards
1 kilometer	0.621 mile
1 gram	0.035 ounce
1 kilogram	2.205 pounds
1 milliliter	0.034 fluid ounce
1 liter	1.057 quart or 0.264 gallon

## Percent

10. On the line segment below, mark and label 0%, 25%, 50%, 75%, and 100%.



11. Write the percent shaded for the picture below.



12. Find 22% of 80.

13. Find 40% of 75.

14. A jacket costs \$49.95. It is on sale for 30% off.

a) Discount = \$ \_\_\_\_\_

b) Sale Price = \$ \_\_\_\_\_

15. At the store, you buy items that total \$38.34. Sales tax is 8%.

a) Sales Tax = \$ \_\_\_\_\_

b) Total Cost = \$ \_\_\_\_\_

16. A bag contains 88 jelly beans. You ate 25% of them. **How many were left in the bag?**

17. There were 115 students on the Sharks team. 46% of the students were boys.

How many boys on the Sharks team? \_\_\_\_\_ boys

How many girls on the Sharks team? \_\_\_\_\_ girls



18. What percent of 400 is 20?
19. Find 45% of 12.
20. 20% of what number is 24?
21. Find the percent of change and tell whether it is an increase or a decrease:  
a) from 1.2 to 0.2                      b) from 8.8 to 30
22. 30% of the glee club members showed up for the party. If 12 students showed up, how many members did not show up?
23. Suzie paid \$89.12 for a shirt, and this included 4.5% sales tax. What was the price of the shirt before tax?
24. A hot dog at the beach is marked up 80% from the wholesale cost of \$0.75. What will be the price of the hot dog?
25. A t-shirt normally costs \$19.95, but is on sale for 20% off. Tax is 6.5%. What will be the final cost of the t-shirt?
26. A Lays Ruffles Sour Cream N Bacon Chips bag says its mass is 235g. However, you place it on a super sensitive scale and it actually weighs 241g. What is the percent of error?

**IV. Interest...  $I=prt$**

27. Find the simple interest if \$150 is deposited at an interest rate of 9% for 2 years. What is the balance?

28. Find the simple interest if \$6000 is deposited at an interest rate of 3% for 6 months. What is the balance?

29. Convert between forms to find the equivalent values in each row.

Percent	Decimal	Fraction
82%		
	6%	
		$\frac{11}{20}$
	1.2	