



# University Middle School Math Summer Work

*Students entering*  
*Algebra 1 Honors*

Due: Monday August 17, 2020  
Please Email [sdmoody1@memphis.edu](mailto:sdmoody1@memphis.edu) for any  
questions or help with specific sections

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Complete a function table with a given two operation rule.

**Examples:**

The solution of an equation with two variables consists of two numbers, one for each variable, that make the equation true. The solution is usually written as an ordered pair.

The cost to rent a bicycle at the beach includes a rental fee of 5 dollars plus 3 dollars for each hour. The equation for the cost of renting a bicycle is:

$$C = 3H + 5$$

$C$  is the total cost and  $H$  is the number of hours.

Bicycle Rentals		
Hours	$3H + 5$	Cost (dollars)
1	$3(1) + 5$	8
2	$3(2) + 5$	11
3	$3(3) + 5$	14
4	$3(4) + 5$	17

Complete the following tables:

1.)

$$C = 3H + 4$$

H	$3H + 4$	C
2	$3(2) + 4$	
4		
6		
10		

2.)

$$Y = 5X + 2$$

X	$5X + 2$	Y
3		
6		
9		
12		

3.)

$$Y = 5X - 3$$

X	$5X - 3$	Y
1	$5(1) - 3$	2
2		
3		
4		

4.)

$$A = 4B - 3$$

B	$4B - 3$	A
3		
4		
5		
6		

5.)

$$Y = 2 + 10X$$

X	$2 + 10X$	Y
3	$2 + 10(3)$	32
4		
5		

6.)

$$6B - 1 = A$$

B	$6B - 1$	A
8	$6(8) - 1$	47
10		
12		

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Write an algebraic expression to represent unknown quantities with one unknown and 1 or 2 operations.

**Examples:**

The tables below show phrases written as mathematical expressions.

Phrases	Expression
9 more than a number the sum of 9 and a number a number plus 9 a number increased by 9 the total of $x$ and 9	$x + 9$
Phrases	Expression
6 multiplied by $g$ 6 times a number the product of $g$ and 6	$6g$

Phrases	Expression
4 subtracted from a number a number minus 4 4 less than a number a number decreased by 4 the difference of $h$ and 4	$h - 4$
Phrases	Expression
a number divided by 5 the quotient of $t$ and 5 divide a number by 5	$\frac{t}{5}$

Write each phrase as an algebraic expression.

1.) 7 less than $m$	2.) The quotient of 3 and $y$
3.) 7 years younger than Jessica	4.) 3 times as many marbles as Bob has
5.) Let $t$ = the number of tomatoes Tye planted last year. This year she planted 3 times as many. Write an algebraic expression to show how many tomatoes Tye planted this year.	6.) Last week Jason sold $x$ number of hot dogs at the football game. This week he sold twice as many as last week, and then he sold 10 more. Write an expression to show how many hot dogs Jason sold this week.

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Evaluate an algebraic expression using one unknown and no more than 2 operations.

**Example 1:** Evaluate  $6x - 7$  if  $x = 8$ .

$$\begin{aligned} 6x - 7 &= 6(8) - 7 && \text{Replace } x \text{ with } 8. \\ &= 48 - 7 && \text{Use order of operations.} \\ &= 41 && \text{Subtract 7 from 48.} \end{aligned}$$

**Example 2:** Evaluate  $5m - 15$  if  $m = 6$ .

$$\begin{aligned} 5m - 15 &= 5(6) - 15 && \text{Replace } m \text{ with } 6. \\ &= 30 - 15 && \text{Use order of operations.} \\ &= 15 && \text{Subtract 15 from 30.} \end{aligned}$$

**Example 3:** Evaluate  $\frac{7b}{3}$  if  $b = 6$ .

$$\begin{aligned} \frac{7b}{3} &= \frac{(7)(6)}{3} && \text{Replace } b \text{ with } 6. \\ &= \frac{42}{3} && \text{Multiply 6 by 7.} \\ &= 14 && \text{Divide.} \end{aligned}$$

**Example 4:** Evaluate  $x^3 + 4$  if  $x = 3$ .

$$\begin{aligned} x^3 + 4 &= 3^3 + 4 && \text{Replace } x \text{ with } 3. \\ &= 27 + 4 && \text{Use order of operations.} \\ &= 31 && \text{Add 27 and 4.} \end{aligned}$$

Evaluate the following expressions using the given values for a, b, and c. Show each step!

1.) Evaluate  $6 + 3b$  if  $b = 7$

2.) Evaluate  $6a^2$  if  $a = 4$

3.) Evaluate  $5(6) - c$  if  $c = 7$

4.) Evaluate  $\frac{b^4}{4}$  if  $b = 2$

5.) Evaluate  $\frac{7.5m}{5}$  if  $m = 2$

6.) Evaluate  $\frac{(n)^2}{3}$  if  $n = 9$

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Evaluate numeric expressions using order of operations with no more than 4 operations.

**Use the order of operations to evaluate numerical expressions.**

1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

**Example 1:** Evaluate  $14 + 3(7 - 2) - 2 \cdot 5$

$$\begin{aligned}
 &14 + 3(7 - 2) - 2 \cdot 5 \\
 &= 14 + 3(5) - 2 \cdot 5 && \text{Subtract first since } 7 - 2 \text{ is in parentheses} \\
 &= 14 + 15 - 2 \cdot 5 && \text{Multiply left to right, } 3 \cdot 5 = 15 \\
 &= 14 + 15 - 10 && \text{Multiply left to right, } 2 \cdot 5 = 10 \\
 &= 29 - 10 && \text{Add left to right, } 14 + 15 = 29 \\
 &= 19 && \text{Subtract 10 from 29}
 \end{aligned}$$

**Example 2:**  $8 + (1 + 5)^2 \div 4$

$$\begin{aligned}
 &8 + (1 + 5)^2 \div 4 \\
 &= 8 + (6)^2 \div 4 && \text{Add first since } 1 + 5 \text{ is in parentheses} \\
 &= 8 + 36 \div 4 && \text{Find the value of } 6^2 \\
 &= 8 + 9 && \text{Divide 36 by 4} \\
 &= 17 && \text{Add 8 and 9}
 \end{aligned}$$

Evaluate each of the following. Show each step!

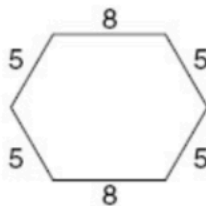
1.)  $(2 + 10)^2 \div 4$

2.)  $(6 + 5) \cdot (8 - 6)$

3.)  $72 \div 3 - 5(2.8) + 9$

4.)  $3 \cdot 14(10 - 8) - 60$

5.) The perimeter of a hexagon is found by adding the lengths of all six sides of the hexagon. For the hexagon below write a numerical expression to find the perimeter. Then evaluate the expression.



6.) Without parentheses, the expression  $8 + 30 \div 2 + 4$  equals 27. Place parentheses in the expression so that it equals 13; then 23.

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Algebra, Patterns, and Functions**

**Objective:** Write equations and inequalities - A

**Examples:**

The table below shows sentences written as an equation.

Sentences	Equation
Sixty less than three times the amount is \$59. Three times the amount less 60 is equal to 59. 59 is equal to 60 subtracted from three times a number. A number times three minus 60 equals 59.	$3n - 60 = 59$

Write an equation for each of the following:

1.) 4 less than 3 times a number is 14.

2.) There are 5 people in Johnny's rock band. They made x dollars playing at a dance hall. After dividing the money 5 ways, each person got \$67.

3.) The Washington Monument is 555 feet tall. It is 75 feet shorter than the Gateway to the West Arch.

4.) The lifespan of a zebra is 15 years. The lifespan of a black bear is 3 years longer than the lifespan of a zebra. Write an addition equation that you could use to find the lifespan of a bear.

5.) A gardening expert recommends that flower bulbs be planted to a depth of three times their height. Suppose Jenna determines that a certain bulb should be planted at a depth of 4.5 inches. Write an equation to find the height of the bulb.

6.) The electric company charges \$0.06 per kilowatt hour of electricity used. Write a multiplication equation to find the number of kilowatt hours of electricity for which the Estevez family was charged if their electric bill was \$45.84.

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Algebra, Patterns, and Functions**

**Objective:** Write equations and **inequalities** - B

An **inequality** is a mathematical sentence that contains the symbols  $<$ ,  $>$ ,  $\leq$ , or  $\geq$ .

Words	Symbols
$m$ is greater than 7.	$m > 7$
$r$ is less than $-4$ .	$r < -4$
$t$ is greater than or equal to 6.	$t \geq 6$
$y$ is less than or equal to 1.	$y \leq 1$

**Examples:**

- 1) Two times a number is greater than 10      $2x > 10$
- 2) Three less than a number is less than or equal to 7.      $x - 3 \leq 7$
- 3) The sum of a number and 1 is at least 5.      $x + 1 \geq 5$
- 4) Cody has \$50 to spend. How many shirts can he buy at \$16.50 each?      $16.50x \leq 50$

Write an inequality for each of the following:

1.) Five times a number is greater than 25.

2.) The sum of a number and 6 is at least 15.

3.) 24 divided by some number is less than 7.

4.) Five dollars less than two times Chris' pay is at most \$124.

5.) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio.

6.) Suppose a DVD costs \$19 and a CD costs \$14. Write an inequality to find how many CDs you can buy along with one DVD if you have \$65 to spend.

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Determine the unknown in a linear equation with 1 or 2 operations

Remember, equations must always remain balanced.

- If you add or subtract the same number from each side of an equation, the two sides remain equal.
- If you multiply or divide the same number from each side of an equation, the two sides remain equal.

**Example 1: Solve  $x + 5 = 11$**

$$\begin{array}{rcl} x + 5 & = & 11 \\ - 5 & = & - 5 \\ \hline x & = & 6 \end{array}$$

Write the equation  
Subtract 5 from both sides  
Simplify



$$\begin{array}{rcl} x + 5 & = & 11 \\ 6 + 5 & = & 11 \\ 11 & = & 11 \checkmark \end{array}$$

Write the equation  
Replace x with 6  
The sentence is true

**Example 2: Solve  $-21 = -3y$**

$$\begin{array}{rcl} -21 & = & -3y \\ -3 & = & -3 \\ \hline 7 & = & y \end{array}$$

Write the equation  
Divide each side by -3  
Simplify



$$\begin{array}{rcl} -21 & = & -3y \\ -21 & = & -3(7) \\ -21 & = & -21 \end{array}$$

Write the equation  
Replace the y with 7  
Multiply – is the sentence true?

**Example 3: Solve  $3x + 2 = 23$**

$$\begin{array}{rcl} 3x + 2 & = & 23 \\ - 2 & = & - 2 \\ \hline 3x & = & 21 \\ \hline 3 & 3 & \\ x & = & 7 \end{array}$$

Write the equation  
Subtract 2 from each side  
Simplify  
Divide each side by 3  
Simplify



$$\begin{array}{rcl} 3x + 2 & = & 23 \\ 3(7) + 2 & = & 23? \\ 21 + 2 & = & 23? \\ 23 & = & 23? \end{array}$$

Write the equation  
Replace x with 7  
Multiply  
Add – is the sentence true?

1.) Solve  $x - 9 = -12$

2.) Solve  $48 = -6r$

3.) Solve  $2t + 7 = -1$

4.) Solve  $4t + 3.5 = 12.5$

5.) It costs \$12 to attend a golf clinic with a local pro. Buckets of balls for practice during the clinic cost \$3 each. How many buckets can you buy at the clinic if you have \$30 to spend?

6.) An online retailer charges \$6.99 plus \$0.55 per pound to ship electronics purchases. How many pounds is a DVD player for which the shipping charge is \$11.94?



# Algebra 1 Honors - Summer Math Packet

## Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Solve for the unknown in an inequality with one variable.

An **inequality** is a mathematical sentence that contains the symbols  $<$ ,  $>$ ,  $\leq$ , or  $\geq$ .

Words	Symbols
$m$ is greater than 7.	$m > 7$
$r$ is less than $-4$ .	$r < -4$
$t$ is greater than or equal to 6.	$t \geq 6$
$y$ is less than or equal to 1.	$y \leq 1$

### Example 1: Solve $v + 3 < 5$

$$\begin{array}{r} v + 3 < 5 \quad \text{Write the inequality} \\ -3 \quad -3 \quad \text{Subtract 3 from each side} \\ \hline v < 2 \quad \text{Simplify} \end{array}$$

**Check:** Try 1, a number less than 2

$$\begin{array}{l} v + 3 < 5 \quad \text{Write the inequality} \\ 1 + 3 < 5 \quad \text{Replace } v \text{ with } 1 \\ 4 < 5? \quad \text{Is this sentence true? } \mathbf{yes} \end{array}$$

### Example 2: Solve $2x + 8 < 24$

$$\begin{array}{r} 2x + 8 < 24 \quad \text{Write the inequality} \\ -8 \quad -8 \quad \text{Subtract 8 from each side} \\ \hline 2x < 16 \quad \text{Simplify} \\ \frac{2x}{2} < \frac{16}{2} \quad \text{Divide each side by 2} \\ x < 8 \quad \text{Simplify} \end{array}$$

**Check:** Try 7, a number less than 8

$$\begin{array}{l} 2x + 8 < 24 \quad \text{Write the inequality} \\ 2(7) + 8 < 24 \quad \text{Replace } x \text{ with } 7 \\ 14 + 8 < 24 \quad \text{Multiply 7 by 2} \\ 22 < 24? \quad \text{Is the sentence true? } \mathbf{yes} \end{array}$$

1.) Solve  $y + 5 \leq 14$

2.) Solve  $6u \geq 36$

3.) Solve  $5y + 1 < 36$

4.) Solve  $4x - 6 > -10$

5.) The speed limit on highways in Florida is 70 miles per hour. Write and solve an inequality to find how long it will take you to travel the 105 miles from Orlando to St. Augustine if you travel at or below the speed limit.

6.) You have \$80. Jeans cost \$29 and shirts cost \$12. Mom told you to buy one pair of jeans and use the rest of the money to buy shirts. Use this information to write and solve an inequality. How many shirts you can buy?

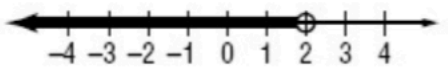
## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Identify or graph solutions of inequalities on a number line.

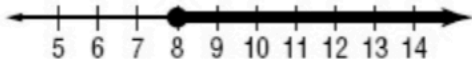
**Examples:** Graph each inequality on a number line.

$$x < 2$$



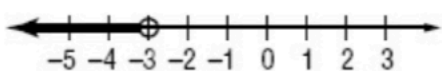
The open circle means that the number is **not** included in the solution.

$$y \geq 8$$



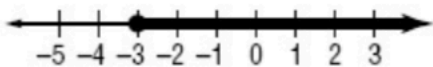
The closed circle means that the number **is** included in the solution.

$$m < -3$$

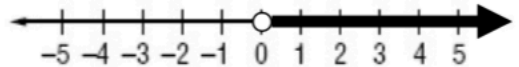


The solution is all numbers less than negative three.  
-3 is **not** included in the solution.

1.) Write an inequality for the graph.

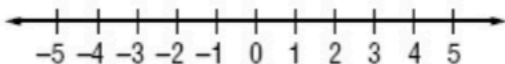


2.) Write an inequality for the graph.



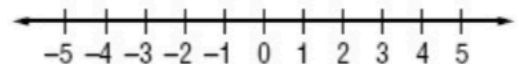
3.) Graph the inequality.

$$b \geq -1$$



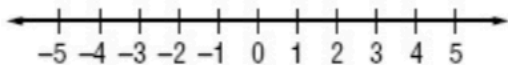
4.) Graph the inequality.

$$z < 3$$



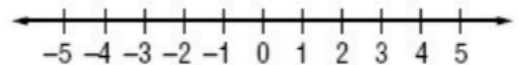
5.) Solve the inequality, then graph it on the number line.

$$y + 9 \leq 13$$



6.) Solve the inequality, then graph it on the number line.

$$4x - 6 > -10$$



# Algebra 1 Honors - Summer Math Packet

## Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Graph rational numbers on a number line.

**Rational Numbers** are numbers that can be written as fractions.

Some examples of rational numbers are  $\frac{1}{2}$ ,  $5\frac{3}{4}$ , 0.8, and -1.4444...

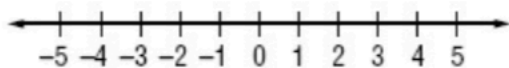
**Example:** Graph and label the following numbers on the number line:

A:  $\frac{1}{2}$     B:  $4\frac{1}{4}$     C: -4.5    D: 2.5



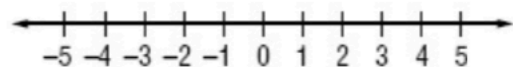
1.) Graph and label the following numbers on the number line.

A: -5    B: -1    C: 2    D: 5



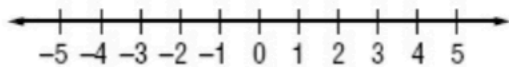
2.) Graph and label the following numbers on the number line.

A: 0    B:  $-1\frac{1}{2}$     C:  $\frac{5}{2}$     D: 4



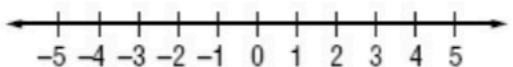
3.) Graph and label the following numbers on the number line.

A: 1.5    B: -0.5    C: -3.5    D: 3.5



4.) Graph and label the following numbers on the number line.

A:  $-\frac{9}{3}$     B:  $-\frac{3}{2}$     C:  $\frac{9}{4}$     D:  $\frac{12}{3}$



5.) Jonah recorded the temperature for 5 days on a chart. Draw a number line and graph the temperatures. Where do the numbers on the line need to begin and end? Label the points 1 to 5.

Day 1	Day 2	Day 3	Day 4	Day 5
45°	50°	53°	57°	60°



6.) Graphing numbers on a number line can help you put them in order from smallest to greatest. Draw a number line and graph the numbers in the chart below. Label the points. Which number is the smallest?

V	W	X	Y	Z
20	-10	-15	5	10



# Algebra 1 Honors - Summer Math Packet

## Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Graph ordered pairs in a coordinate plane.

The **coordinate plane** is used to locate points. The horizontal number line is the **x-axis**. The vertical number line is the **y-axis**. Their intersection is the **origin**.

Points are located using **ordered pairs**. The first number in an ordered pair is the **x-coordinate**; the second number is the **y-coordinate**.

The coordinate plane is separated into four sections called **quadrants**.

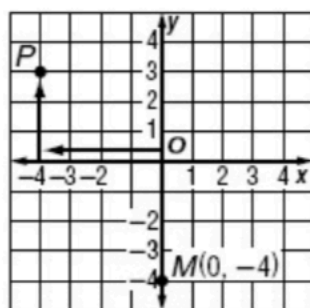
**Example 1:** Name the ordered pair for point P. Then identify the quadrant in which P lies.

- Start at the origin.
- Move 4 units left along the x-axis.
- Move 3 units up on the y-axis.

The ordered pair for point P is  $(-4, 3)$ .

P is in the upper left quadrant or quadrant II.

Quadrant 2      Quadrant 1



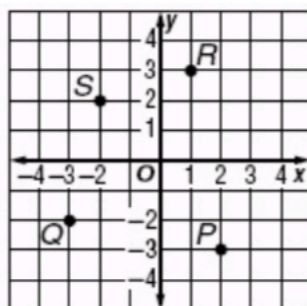
Quadrant 3      Quadrant 4

**Example 2:** Graph and label the point M  $(0, -4)$ .

- Start at the origin.
- Move 0 units along the x-axis.
- Move 4 units down on the y-axis.
- Draw a dot and label it M  $(0, -4)$ .

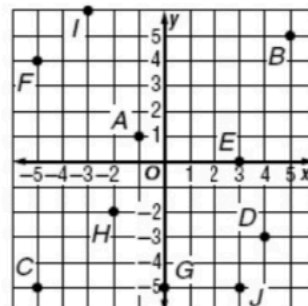
1.) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

Coordinates	Quadrant
P (__, __)	__
Q (__, __)	__
R (__, __)	__
S (__, __)	__



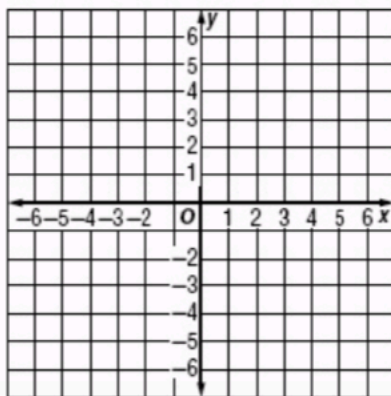
2.) Find each of the points below on the coordinate plane. Then identify the quadrant in which each point lies.

Coordinates	Quadrant
A (__, __)	__
J (__, __)	__
B (__, __)	__
H (__, __)	__



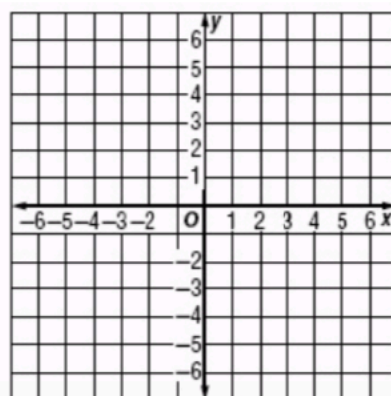
3.) Graph and label each point on the coordinate plane.

- N  $(3, -1)$   
 P  $(-2, 4)$   
 Q  $(-3, -4)$   
 R  $(0, 0)$   
 S  $(-5, 0)$



4.) Graph and label each point on the coordinate plane.

- D  $(0, 4)$   
 E  $(5, 5)$   
 G  $(-3, 0)$   
 H  $(-6, -2)$   
 J  $(0, -2)$



## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Algebra, Patterns, and Functions

**Objective:** Identify and describe the change represented in a table of values; identify increase, decrease, or no change.

**Example:** Look at the table below. How are Wages (y) affected by the number of Hours Worked (x)? Identify the change as **increasing**, **decreasing**, or **no change**. Describe the changes in y-values.

Hours Worked (x)	Wages (y)
2	\$14
4	\$28
6	\$42
8	\$56



As the Hours Worked (x) increase, the wages (y) increase.  
Wages increase by \$14 dollars for every 2 hours worked (or \$7 for every hour worked).

Identify the change in each table of values as **increasing**, **decreasing**, or **no change**. Describe the changes in y-values.

1.)

Homework Minutes (x)	Test Grades (y)
25	61
35	74
45	87
55	100

2.)

Time Hours (x)	Distance Miles (y)
1	50
2	100
3	150
4	200

3.)

Temperature (x)	Dewpoint (y)
68°	1.9°
76°	1.3°
91°	0.7°
104°	0.1°

4.)

Cell Phone Plan Minutes (x)	Cost (y)
625	\$59.99
723	\$59.99
829	\$59.99
899	\$59.99

5.)

Month (x)	Fee (\$) (y)
1	22
2	44
3	66
4	88

6.)

Oil changes per year (x)	Cost of Car Repairs \$ (y)
0	1000
1	700
2	400
3	100

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Determine equivalent forms of rational numbers expressed as **fractions**, **decimals**, percents, and ratios. - A

**Examples:**

To write a decimal as a fraction, divide the numerator of the fraction by the denominator.

Use a power of ten in the denominator to change a decimal to a fraction.

Write  $\frac{5}{9}$  as a decimal.  $9 \overline{) 5.000} = 0.\overline{5}$  because 5 repeats forever.

$$\begin{array}{r}
 0.555 \\
 9 \overline{) 5.000} \\
 \underline{-45} \phantom{00} \\
 50 \phantom{0} \\
 \underline{-45} \phantom{0} \\
 50 \\
 \underline{-45}
 \end{array}$$

Write 0.32 as a fraction in simplest form.  $0.32 = \frac{32}{100} = \frac{\div 4}{\div 4} = \frac{8}{25}$

1.) Write 0.735353535... using bar notation to represent the repeating decimal.

2.) Write  $\frac{3}{5}$  as a decimal.

3.) Write  $4\frac{5}{8}$  as a decimal.

4.) Write 0.94 as a fraction in simplest form.

5.) Write 0.48 as a fraction in simplest form.

6.) There were 6 girls and 18 boys in Mrs. Johnson's math class. Write a ratio of the # of girls to the # of boys in fraction form. Then write the fraction as a repeating decimal.

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Determine equivalent forms of rational numbers expressed as **fractions**, decimals, **percents**, and **ratios**. - B

**Examples:**

A **RATIO** is a comparison of two numbers by division. When a ratio compares a number to 100, it can be written as a **PERCENT**. To write a ratio or fraction as a percent, find an equivalent fraction with a denominator of 100. You can also use the meaning of percent to change percents to fractions.

Write  $\frac{19}{20}$  as a percent.

$$\frac{19}{20} \cdot \frac{5}{5} = \frac{95}{100} = 95\% \quad \text{Since } 100 \div 20 = 5, \text{ multiply the numerator and denominator by 5.}$$

Write 92% as a fraction in simplest form.

$$\frac{92}{100} = \frac{\div 4}{\div 4} = \frac{23}{25}$$

Write 92% as a decimal.      Move decimal two places to the left. Add zeros if needed.      92.0% = 0.92

Write 0.4 as a percent.      Move decimal two places to the right. Add zeros if needed.      0.4 = 40%

1.) Write  $\frac{7}{25}$  as a percent and decimal.

2.) Write 19% as a decimal and fraction in simplest form.

3.) Write  $\frac{9}{50}$  as a percent and decimal.

4.) Write 75% as a decimal and fraction in simplest form.

5.) Ms. Crest surveyed her class and found that 15 out of 30 students brushed their teeth more than twice a day. Write this ratio as a fraction in simplest form, then write it as a % and a decimal.

6.) A local retail store was having a sale and offered all their merchandise as a 25% discount. Write this percent as a fraction in simplest form, then write it as a decimal.



## Algebra 1 Honors - Summer Math Packet

**Unit:** Knowledge of Number Relationships & Computation

**Objective:** Compare, order, and describe rational numbers.

**Examples:**

- RATIONAL** numbers include fractions, decimal, and percents. To **COMPARE** or **ORDER** rational numbers, they must be in the same form (all fraction or all decimals, or all %s)

**Example:** Order 0.6, 48%, and  $\frac{1}{2}$  from least to greatest.

**Step 1 – Change all to decimals.**

0.6

48% = 0.48

$\frac{1}{2} = 0.5$

**Step 2 – Compare decimals & Order.**

0.48, 0.5, 0.6

**Step 3 – Write using original form.**

48%,  $\frac{1}{2}$ , 0.6

1.) Order from least to greatest.

22%, 0.3,  $\frac{1}{5}$

2.) Order from least to greatest.

0.74,  $\frac{3}{4}$ , 70%

3.) Replace  $\bigcirc$  with <, >, or =.

$\frac{7}{12}$   $\bigcirc$  58%

4.) Which is the largest?

$1\frac{3}{8}$

$1\frac{3}{10}$

$1\frac{4}{9}$

5.) According to the Pet Food Manufacturer's Association, 11 out of 25 people own large dogs and 13 out of 50 medium dogs. Do more people own large or medium dogs?

6.) Your PE teacher asked you to run for specific time period. You ran 0.6 of the time. Two of your friends ran  $\frac{7}{10}$  and 72% of the time. Order the amount of time you and your friends ran from least to greatest.



## Algebra 1 Honors - Summer Math Packet

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, multiply and divide integers. - A

Examples:

### ADDITION INTEGER RULES:

For integers with the same sign:

- The sum of two positive integers is **POSITIVE**.
- The sum of two negative integers is **NEGATIVE**.

For integers with different signs, subtract their absolute value. The sum is:

- Positive IF the positive integer has the greater absolute value.
- Negative IF the negative integers has the greater absolute value.

Examples:

$$-6 + (-3) = \text{add keep the sign} = -9$$

$$-34 + (-21) = \text{add keep the sign} = -55$$

$$8 + (-7) = \text{subtract keep the sign of the higher} = 1$$

$$-5 + 4 = \text{subtract keep the sign of the higher} = -1$$

### SUBTRACTION INTEGER RULES:

- Keep the first number the same
- Switch the subtraction sign to **ADDITION**
- Change the second number to its opposite. Opposite: -6 to 6
- Follow Addition rules above.

Examples:

$$6 - 9 = 6 + (-9) = -3$$

$$-10 - (-12) = -10 + 12 = 2$$

$$-3 - 7 = -3 + (-7) = -10$$

$$1 - (-2) = 1 + 2 = 3$$

1.) Add:  $2 + (-7)$

2.) Subtract:  $-13 - 8$

3.) Evaluate  $a - b$  if  $a = -2$  and  $b = -7$

4.) Evaluate  $x + y + z$  if  $x = 3$ ,  $y = -5$ , and  $z = -2$

5.) In Mongolia the temperature can dip down to  $-45^{\circ}\text{C}$  in January. The temperature in July may reach  $40^{\circ}\text{C}$ . What is the temperature range in Mongolia?

6.) Write an addition expression to describe skateboarding situation. Then determine the sum.

Hank starts at the bottom of a half pipe 6 feet below street level. He rises 14 feet at the top of his kickturn.

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Number Relationships & Computation**

**Objective:** Add, subtract, multiply and divide integers. - B

**Examples:**

**MULTIPLYING & DIVIDING INTEGER RULES:**

- Two integers with DIFFERENT signs the answer is NEGATIVE.
- Two integers with SAME signs the answer is POSITIVE.

**Examples:**

$5(-2) = 5 \text{ times } -2$ , the signs are different so the answer will be negative = - 10

$(-6) \cdot (-9) =$  the signs are the same so the answer will be positive = 54

$30 \div (-5) =$  the signs are different so the answer will be negative = - 6

$-100 \div (-5) =$  the signs are the same so the answer will be positive = 20

1.) Multiply:  $-14(-7)$

2.) Divide:  $350 \div (-25)$

3.) Evaluate if  $a = -3$  and  $c = 5$

$$-3ac$$

4.) Evaluate if  $d = -24$ ,  $e = -4$ , and  $f = 8$

$$\frac{de}{f}$$

5.) A computer stock decreased 2 points each hour for 6 hours. Determine the total change in the stock value over the 6 hours.

6.) A submarine descends at a rate of 60 feet each minute. How long will it take it to descend to a depth of 660 feet below the surface?

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Add, subtract, and multiply positive fractions and mixed numbers. - A

**Examples:**

- To add unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.

$$\text{Add: } \frac{1}{6} + \frac{2}{5} = \frac{1}{6} \cdot \frac{5}{5} = \frac{5}{30} \qquad \frac{2}{5} = \frac{2 \times 6}{5 \times 6} = \frac{12}{30} \qquad \frac{5}{30} + \frac{12}{30} = \frac{17}{30}$$

$$\text{Add: } 12\frac{1}{2} + 8\frac{2}{3} = 12\frac{1}{2} = 12\frac{1 \times 3}{2 \times 3} = 12\frac{3}{6} \qquad 8\frac{2}{3} = 8\frac{2 \times 2}{3 \times 2} = 8\frac{4}{6}$$

$$12\frac{3}{6} + 8\frac{4}{6} = 20\frac{7}{6} \qquad \frac{7}{6} \text{ is improper so we must change it to proper. } 7 \text{ divided by } 6 = 1\frac{1}{6}$$

$$20 + 1\frac{1}{6} = 21\frac{1}{6}$$

1.) Add:  $\frac{1}{3} + \frac{1}{9}$

2.) Add:  $7\frac{4}{9} + 10\frac{2}{9}$

3.) Add:  $1\frac{5}{9} + 4\frac{1}{6}$

4.) Add:  $2\frac{1}{2} + 2\frac{2}{3}$

5.) A quiche recipe calls for  $2\frac{3}{4}$  cups of grated cheese.

A recipe for quesadillas requires  $1\frac{1}{3}$  cups of grated cheese. What is the total amount of grated cheese needed for both recipes?

6.) You want to make a scarf and matching hat. The pattern calls for  $1\frac{7}{8}$  yards of fabric for the scarf and

$2\frac{1}{2}$  yards of fabric for the hat. How much fabric do you need in all?

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Add, **subtract**, and multiply positive fractions and mixed numbers. - B

**Examples:**

- To subtract unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.

$$\text{Subtract: } \frac{7}{8} - \frac{1}{2} =$$

$$\frac{7}{8} = \frac{7 \times 1}{8 \times 1} = \frac{7}{8}$$

$$\frac{1}{2} = \frac{1 \times 4}{2 \times 4} = \frac{4}{8}$$

$$\frac{7}{8} - \frac{4}{8} = \frac{3}{8}$$

$$\text{Subtract: } 5\frac{3}{4} - 2\frac{1}{3} =$$

$$5\frac{3}{4} = 5\frac{3 \times 3}{4 \times 3} = 5\frac{9}{12}$$

$$2\frac{1}{3} = 2\frac{1 \times 4}{3 \times 4} = 2\frac{4}{12}$$

$$5\frac{9}{12} - 2\frac{4}{12} = 3\frac{5}{12}$$

**\*\*Note:** If you have to borrow from the whole number change to improper fractions, find a common denominator, subtract, and then change back to proper fractions.

1.) Subtract:  $\frac{9}{10} - \frac{1}{10}$

2.) Subtract:  $\frac{2}{3} - \frac{1}{6}$

3.) Subtract:  $9\frac{7}{10} - 4\frac{3}{5}$

4.) Subtract:  $5\frac{3}{8} - 4\frac{11}{12}$

\*Hint: Change to improper fractions first!

5.) Melanie had  $4\frac{2}{3}$  pounds of chopped walnuts. She used  $1\frac{1}{4}$  pounds in a recipe. How many pounds of chopped walnuts did she have left?

6.) Lois has  $3\frac{1}{3}$  pounds of butter. She uses  $\frac{3}{4}$  pound in a recipe. How much does she have left? \*Hint: Change to improper fractions first.

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Number Relationships & Computation**

**Objective:** Add, subtract, and multiply positive fractions and mixed numbers. - C

**Examples:**

- To multiply fractions – Multiply the numerators & denominators.
- Be sure to change mixed numbers to improper fractions before multiplying.

$$\frac{1}{3} \times \frac{5}{8} = \frac{5}{24}$$

$$1\frac{1}{3} \times 3\frac{2}{5} = \frac{4}{3} \times \frac{17}{5} = \frac{68}{15} = 4\frac{8}{15}$$

**\*\*Remember:** Changing mixed numbers to improper fractions.  $2\frac{3}{4} = 4 \times 2 + 3 = \frac{11}{4}$

$$1\frac{1}{3} \times 21 = \frac{4}{3} \times \frac{21}{1} = \frac{4 \times 21}{3 \times 1} = \frac{84}{3} = 28$$

1.)  $\frac{2}{3} \times \frac{4}{5} =$

2.)  $\frac{7}{3} \times 4\frac{1}{2} =$

3.)  $2\frac{1}{2} \times 2\frac{1}{3} =$

4.)  $3 \times 5\frac{2}{9} =$

5.) Anna wants to make 4 sets of curtains. Each set requires  $5\frac{1}{8}$  yards of fabric. How much fabric does she need?

6.) One sixth of the students at a local college are seniors. The number of freshmen students is  $2\frac{1}{2}$  times that amount. What fraction of the students are freshmen?

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Number Relationships & Computation**

**Objective:** Calculate powers of integers and square roots of perfect square whole numbers.

**Examples:**

**Powers of Integers**

Evaluate  $5^4$ .      Evaluate means to solve.       $5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = 625$

Evaluate  $2^3$ .       $2^3 = 2 \cdot 2 \cdot 2 = 8$

Evaluate  $(-5)^2$ .       $(-5)^2 = -5 \cdot -5 = 25$       Remember to follow integer rules!

**Square Roots**

- A Perfect Square is the square of a whole number.
- A square root of a number is one of two equal factors of the number.
- Every positive number has a positive square root and a negative square root.
- The square root of a negative number such as -25, is not real because the square of a number is never negative.

A.)  $\sqrt{144}$       Since  $12^2 = 144$ , then  $\sqrt{144} = 12$

B.)  $-\sqrt{49}$       Since  $7^2 = 49$ , then  $\sqrt{49} = 7$

C.)  $\pm\sqrt{4}$       Since  $2^2 = 4$ , then  $\pm\sqrt{4} = \pm 2$

1.) Evaluate:  $13^2 =$

2.) Evaluate:  $\sqrt{81} =$

3.) Evaluate:  $(-4)^3 =$

4.) Evaluate:  $\sqrt{100} =$

5.) Evaluate:  $(-2)^2 =$

6.) Evaluate:  $\sqrt{36} =$

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Identify and use the properties of addition and multiplication to simplify expressions using the commutative property.

**Examples:**

PROPERTY	ARITHMETIC	ALGEBRA
Distributive Property	$5(3+4) = 5(3) + 5(4)$	$a(b+c) = a(b) + a(c)$
Commutative Property of Addition	$5 + 3 = 3 + 5$	$a + b = b + a$
Commutative Property of Multiplication	$5 \times 3 = 3 \times 5$	$a \times b = b \times a$
Associative Property of Addition	$(2 + 3) + 4 = 2 + (3 + 4)$	$(a + b) + c = a + (b + c)$
Associative Property of Multiplication	$(4 \times 5) \times 6 = 4 \times (5 \times 6)$	$(a \times b) \times c = a \times (b \times c)$
Identity Property of Addition	$5 + 0 = 5$	$a + 0 = a$
Identity Property of Multiplication	$5 \times 1 = 5$	$a \times 1 = a$

1.) Use the distributive property to write the expression as an equivalent expression. Then evaluate the expression.

$$3(5 + 1) =$$

2.) Name the property shown:

$$6 + (1 + 4) = (6 + 1) + 4$$

3.) Name the property shown:

$$y \times 3 = 3 \times y$$

4.) Name the property shown:

$$b + 0 = b$$

5.) Mr. Brooks was working on addition using dominoes with a group of 1<sup>st</sup> graders. When picking the domino with 3 dots on one end and 5 dots on the other, some students read, "3 plus 5 equals 8" while others read it as "5 plus 3 equals 8." What property were these students using? Explain.

6.) Students in Mr. River's class were practicing their multiplication skills by rolling three 6-sided number cubes. Bailey rolled a 2, a 3, and a 5 on her roll. He multiplied the three numbers as follows using the order of operations:  $(2 \times 3) \times 5 = 30$ . Write another way Bailey could have performed the multiplication without changing the order of the numbers. State the property you used.

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Number Relationships & Computation**

**Objective:** Estimate to determine approximate sums, differences, products, and quotients.

**Examples:**

Estimate by rounding to the nearest whole numbers.

**GOAL:** to make the problem simpler – estimate before computing.

**Decimals:**

$$23.485 - 9.757 = 23 - 10 = 13$$

$$6.43 + 2.17 + 9.1 + 4.87 = 6 + 2 + 9 + 5 = 22$$

$$43.9 \times 37.5 = 40 \times 40 = 1600$$

$$432.87 \div 8.9 = 450 \div 9 = 50$$

**Fractions:**

$$3\frac{2}{3} + 5\frac{1}{6} = 4 + 5 = 9$$

$$6\frac{2}{5} \times 1\frac{7}{8} = 6 \times 2 = 12$$

$$8\frac{7}{9} \div 2\frac{3}{4} = 9 \div 3 = 3$$

**Estimate by rounding:**

1.)  $34.84 - 17.69 + 8.4$

2.)  $2\frac{1}{5} + 3\frac{1}{2} =$

3.)  $26.3 \times 9.7$

4.)  $4\frac{3}{8} \times 5\frac{1}{4} =$

5.)  $41.79 \div 6.8$

6.)  $15\frac{8}{9} \div 3\frac{3}{5} =$



## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Determine or use **ratios**, **unit rates**, and percents in the context of the problem. - A

**Examples:**

- A **RATE** is a fixed ratio between two quantities of different units, such as miles and hours, dollars and hours, points and games. If the second number of a rate is 1 then the rate is called a **UNIT RATE**.
- **UNIT RATE** examples: 60 miles per hour and \$15 per hour

Last week Mike worked 30 hours and earned \$240. What was his rate of pay?

**STRATEGY: Divide the total earned by the number of hours.**

Step 1: How much money did Mike earn?

\$240

Step 2: How many hours did he work?

30 hours

Step 3: Determine the rate of pay. Divide the amount of money earned by the number of hours.

$$\frac{\text{amount of \$}}{\text{\# of hours worked}} = \frac{240}{30} = \$8 \text{ per hour}$$

The unit price of a can of tuna fish at the GHK Supermarket is \$2.43. How much will 7 cans cost?

**STRATEGY: Use the definition of unit price.**

Step 1: Unit price means the price of one unit or  
the price of one can of tuna fish.

\$2.43

Step 2: Multiply.

$2.43 \times 7 = \$17.01$

**SOLUTION: Seven cans of tuna fish cost \$17.01**

1.) You earned 20 points on a test out of 50. What was your percent on the test?

2.) Chad purchased 6 Fierce Grape Gatorades for \$12.00. If Chad wanted to go back and buy one Tropical Punch Gatorade at the same price, how much would it cost?

3.) Your family was headed to the beach for summer vacation. You drove 560 miles in 8 hours. Determine how many miles you drove per hour.

4.) Pam typed 325 words in 25 minutes. How many words did she type per minute?

5.) There are 1000 students in a middle school for 4 lunch shifts. Determine how many students will eat on each lunch shift.

6.) Giant Eagle was having a big 4<sup>th</sup> of July sale on sodas. Giant Eagle was selling Coke Fridge Packs at \$3.00 for 12 sodas. Determine the cost of one soda.

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Determine or use ratios, unit rates, and **percents** in the context of the problem. - B

**Examples:**

**Solving Proportions:** Solve  $\frac{8}{a} = \frac{10}{15}$

$$8 \times 15 = a \times 10$$

$$120 = 10a$$

$$120 \div 10 = 10 a \div 10$$

$$12 = a$$

#### PERCENT PROPORTION / EQUATION

$$\frac{\%}{100} = \frac{\text{part (is)}}{\text{total (of)}}$$

Sometimes Proportions involve Percents. In this case, we use the PERCENT PROPORTION.

600 is what percent of 750?

$$\frac{n}{100} = \frac{600}{750}$$

$$n \times 750 = 600 \times 100$$

$$\frac{750 n}{750} = \frac{60000}{750}$$

$$n = 80\%$$

Chad's football team played 25 games. They won 68% of them. How many games did the team win?

Use the percent proportion:

$$\frac{68\%}{100} = \frac{x}{25}$$

Cross multiply:

$$68 \times 25 = 100 x$$

Solve

$$\frac{1700}{100} = \frac{100 x}{100}$$

$$x = 17$$

**Answer:** Chad's football team won 17 out of 25 games.

1.) It is recommended that for every 8 square feet of surface, a pond should have 2 fish. A pond that has a surface of 72 square feet should contain how many fish?



2.) An 8-ounce glass of Orange juice contains 72 milligrams of vitamin C. How much juice contains 36 milligrams of vitamin C?

3.) 9 is what percent of 30?

4.) What percent of 56 is 14?



5.) Kristen and Melissa spent 35% of their \$32.00 on movie tickets. How much money did they spend?



6.) Jake's club has 35 members. Its rules require that 60% of them must be present for any vote. At least how many members must be present to have a vote?

## Algebra 1 Honors - Summer Math Packet

**Unit: Knowledge of Number Relationships & Computation**

**Objective:** Determine rate of increase and decrease, discounts, simple interest, commission, sales tax. - A

**Examples:**

- A percent of change is a ratio that compares the change in quantity to the original amount. If the original quantity is increased, it is a PERCENT OF INCREASE. If the original quantity is decreased, it is a PERCENT OF DECREASE.

Last year 2,376 people attended the rodeo. This year, attendance was 2,950. What was the percent of change in attendance to the nearest whole percent?

- Since this year's attendance is greater than last year's attendance, this is a percent of INCREASE.
- The amount of increase is  $2,950 - 2,376 = 574$ . (Percent of DECREASE: original - new.)
- Use the proportion:  $\frac{\%}{100} = \frac{\text{amount of change}}{\text{original amount}}$   $\frac{n}{100} = \frac{574}{2,376}$   $n = 0.24$  or 24%
- The rodeo attendance increased by about 24%.

### DISCOUNT

Determine the price of a \$69.50 tennis racket that is on sale for 20% off.

- Use the percent proportion to determine the amount of discount.  $\frac{20}{100} = \frac{n}{69.50}$   $20 \times 69.50 = 100n$   
 $\frac{1390}{100} = \frac{100n}{100}$   
 $13.90 = n$

The amount of discount is \$13.90

- Subtract the amount of discount from the price.  $69.50 - 13.90 = \$55.60$   
The sale price of the tennis racket is \$55.60.

1.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: 250  
New: 100

2.) Determine the sale price to the nearest cent.

\$39.00 jeans  
40% off

3.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: \$84  
New: \$100

4.) Justin is buying a cell phone that has a regular price of \$149. The cell phone is on sale for 15% off the regular price. What will be the sale price?

5.) Alicia planted 45 tulip bulbs last year. This year she plans to plant 65 bulbs. Determine the percent of increase in the number of tulip bulbs to the nearest tenth.

\*\*6.) You want to buy a new sweater. The regular price was \$48 dollars. The sale price was \$34. What was the percent of discount to the nearest percent.

## Algebra 1 Honors - Summer Math Packet

### Unit: Knowledge of Number Relationships & Computation

**Objective:** Determine rate of increase and decrease, discounts, **simple interest, commission, sales tax.** - B

**Examples:**

- **SALES TAX** is a percent of the purchase price and is an amount paid in addition to the purchase price.

Determine the total price of a \$17.55 soccer ball if the sales tax is 6%.

Determine the sales tax by changing % to a decimal and multiply.

$$17.55 \times 0.06 = 1.07 \text{ (TAX)}$$

Add price and tax to determine the total price.

$$17.55 + 1.07 = 18.82$$

- **COMMISSION** is the amount a salesman/woman makes for selling items. To determine the amount of commission, change the % to a decimal and multiply by the total amount sold.

Determine the commission for a RV salesman, whose sales for the month of March totaled \$149,000. The salesman earns a 4% commission.

Change 4% to a decimal.

$$4\% = 0.04$$

Multiply decimal and total sold.

$$0.04 \times 149,000 = 5960$$

The RV salesman/woman will make a total commission of \$5,960 for the month of March.

- **SIMPLE INTEREST** the amount of money paid or earned for the use of money. To determine simple interest  $I$ , use the formula  $I = prt$ . Principal  $p$  is the amount of money deposited or invested. Rate  $r$  is the annual interest rate written as a decimal. Time  $t$  is the amount of time the money is invested in years.

Determine the simple interest earned in a savings account where \$136 is deposited for 2 years if the interest rate is 7.5% per year.

$$I = prt$$

$$I = 136 \cdot 0.075 \cdot 2$$

$$I = 20.40$$

The simple interest earned is \$20.40

1.) Jeremy wants to buy a skateboard but does not know if he has enough money. The price of the skateboard is \$85 and the sales tax is 6%. What will be the total cost of the skateboard?

2.) Blake bought two magazines for \$4.95 each. If the sales tax was 6.75%, what was the total amount that he paid for the magazines?

3.) How much interest will Hannah earn in 4 years if she deposits \$630 in a savings account at 6.5% simple interest?

4.) You are a real estate agent. For every house you sell you earn 3.8% commission. This month you sold 2 houses that had a combined total of \$560,950. How much commission will you earn?

5.) When Melissa was born, her parents put \$8,000 into a college fund account that earned 9% simple interest. Determine the total amount in the account after 18 years.

6.) A car salesman earns 7% commission on his total sales this month. If he sells 2 cars at \$15,670 each, and a truck at \$25,995, how much commission will he earn? (hint: You need to find the total amount of sales first)