

Welcome to Statistics!

In the following pages, you will find review materials that will prepare you for Statistics. All of these topics should be review or relatively straight-forward to learn with the given resources. Please take the exercises seriously, as this will allow us to hit the ground running in the fall.

Please remember than Khan Academy is a useful resource. I encourage you to work with your classmates. You're also welcome to email me (beth.hill@icregina.com).

Materials Needed for Statistics:

- Graphing calculator (Texas Instruments) - TI-84 Plus CE or TI-Nspire CX (not CAS). I am more familiar with the TI-84 Plus CE. We will use calculators a lot in Statistics, and a scientific calculator doesn't have the correct capabilities.
- 3-ring binder (1 or 1.5 inches) to keep notes and handouts organized
- Loose-leaf paper
- Folder with 2 pockets (if your 3-ring binder doesn't have pockets)
- Pencils (you must have a pencil for class every day)

The review materials are separated into weeks. These weeks are only a suggestion. You will have the most benefit from this material if you work on it throughout the summer and do a final review of your work a week or two before school starts. You are welcome to work with your classmates but make sure that you are doing your own work.

\*\*\*You may use a calculator on Weeks 1-4 and 7.\*\*\*

\*\*\*This packet must be completed by the first day of class. We will have a quiz or test over the material at the beginning of the semester that will count toward your grade.\*\*\*

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I look forward to seeing everyone on the first day of school!

Mrs. Hill

Most material from:

[http://ufrsdhs.sharpschool.net/UserFiles/Servers/Server\\_1171687/File/Summer%20EOC%20Assignments/stats.pdf](http://ufrsdhs.sharpschool.net/UserFiles/Servers/Server_1171687/File/Summer%20EOC%20Assignments/stats.pdf)

<https://resources.finalsite.net/images/v1589291608/stmarybayview/zjw3wivukdaarnifxo8h/Math-Statistics-AllLevels.pdf>



## Week 1: Probability

### Resources:

[http://www.mathgoodies.com/lessons/vol6/intro\\_probability.html](http://www.mathgoodies.com/lessons/vol6/intro_probability.html)

<http://www.onlinemathlearning.com/independent-probability.html>

<http://www.onlinemathlearning.com/dependent-events.html>

1. You are a contestant on the Wheel of Fun. The spinner contains 4 red panels, 5 yellow panels, 7 blue panels, 1 Bankrupt panels, and 2 Free Spin panels. Utilize this given information to calculate the following probabilities.
  - a. Landing on a red panel
  - b. Landing on anything except a blue panel
  - c. Landing on a yellow or a red panel
  - d. Landing on any non-color panel
2. A scientist is tagging fish in the Allentown Lake. She catches a fish, tags it, and releases it back into the water. The scientist knows the exact number of fish in the lake: 32 bass, 3 bull sharks, 10 carp, and 14 fluke. What is the probability that the scientist will catch:
  - a. a bass and then a carp?
  - b. two consecutive bull sharks?
  - c. a fluke and then any different type of fish?
  - d. a bass, another bass, and then a bull shark?

3. There is a boardwalk game at Point Pleasant where you are blindfolded to throw darts at a board full of balloons. Each time a dart is popped, it is not replaced until the next turn. The board has 10 green, 4 purple, 5 red, 2 tie-dye, and 3 black balloons. Find the probabilities of the following outcomes:
  - a. Popping 2 red balloons on your first 2 throws in one turn
  - b. Popping a red balloon and then a green balloon on your first 2 throws in one turn
  - c. Popping a red balloon, then a black balloon, and then a red balloon on your first 3 throws in one turn
  - d. Popping anything except a tie-dyed balloon on 3 consecutive throws in one turn
  
4. A spinner is labeled with the numbers 1 through 9. What is the probability that you will:
  - a. land on a 3?
  - b. NOT land on a 9?
  - c. land on an even number?
  - d. land on a number less than 6?
  - e. land on a number greater than 12?
  - f. land on a number less than 10?

## Week 2: Discrete Math

### Fundamental Counting Principle

#### Resource:

<http://www.onlinemathlearning.com/counting-principle.html>

1. A restaurant is having a new create your own meal special that includes a choice of appetizer, entrée, and dessert for \$19.99. The choices for each category are shown below.

<u>Appetizer</u>	<u>Entrée</u>	<u>Dessert</u>
Mozzarella sticks	Steak	Brownie sundae
Buffalo wings	Salmon	Apple pie
Potato skins		Cheesecake
		Cinnamon oblivion

Use the fundamental counting principal to calculate the total possible meal combinations for this special.

2. If the restaurant from #1 wanted to increase the total available choices to 36, what can they do to their menu to reflect this change? Explain your answer.
3. A 5-digit security code consists of digits 0 through 9 for each digit. Assuming you can repeat digits, how many total alarm code combinations exist?
4. An Iowa license plate consists of 3 numbers (0 through 9) followed by 3 letters. How many license plate combinations are possible if numbers and letters can be reused?
5. A 3-digit locker combination works best when each number (0-39) is not repeated. How many possible combinations are possible without replacement (no number can be reused)?
6. How many different ways can 6 books be placed on a shelf?

## Permutations

**Resource:** <http://www.onlinemathlearning.com/permutations-math.html>

7. Evaluate the following:
  - a.  $9!$
  - b.  $P(9, 4)$
  - c.  $P(7, 5) + P(12, 6)$
  
8. There are 15 contestants at a figure-skating competition. How many ways can the gold, silver, and bronze medals be awarded?
  
9. The Biker's National Club has 25 members running for the officers (President, Vice President, Secretary, and Treasurer). How many ways can a set of officers be formed?
  
10. How many different ways can you arrange the letters in the word:
  - a. STATISTICS?
  - b. ASSIGNMENT?

## Combinations

**Resource:** <http://www.onlinemathlearning.com/combinations.html>

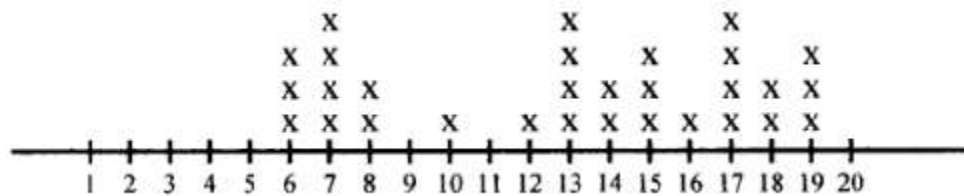
11. Evaluate the following:
  - b.  $C(7, 4)$
  - b.  $C(15, 3)$
  - c.  $C(4, 2) + C(9, 4)$
  
12. A history report requires you to write about three of the original 13 colonies. How many different ways can you choose to complete this task?
  
13. The manager of an accounting firm wants to form a 3-person advisory committee from 16 employees in the firm. In how many ways can the manager form this committee?
  
14. The Mock Trial team requires a 12-person trial team. A total of 10 lawyers and 6 prosecutors applied for the team. How many different possible teams can be assembled if each team must consist of 7 lawyers and 5 prosecutors?

## Week 3: Measures of Central Tendency

### Resources:

- <https://www.onlinemathlearning.com/mean.html>
- <https://www.onlinemathlearning.com/median.html>
- <https://www.onlinemathlearning.com/mode.html>
- <https://www.onlinemathlearning.com/range-statistics.html>
- <https://www.onlinemathlearning.com/line-plots.html>
- <https://www.onlinemathlearning.com/stem-leaf-plot.html>
- <https://www.onlinemathlearning.com/box-plot.html>
- <https://www.onlinemathlearning.com/histograms.html>

- The following line plot shows the number of movies seen per year by a group of Regina students.

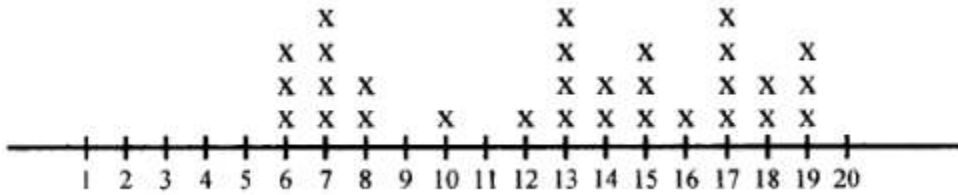


How many students have seen between 6 and 18 movies, inclusively?

- Create a stem-and-leaf plot for the following data set:

21, 33, 31, 35, 17, 27, 19, 20, 27, 27, 17, 29, 32, 34, 24

3. Create a box-and-whisker plot from the line plot below.



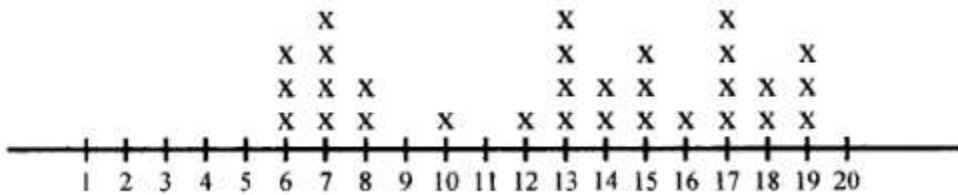
4. Consider the following data set:

42, 24, 21, 22, 33, 35, 17, 31, 17, 19, 27, 20, 47, 17, 39

For the data set, find the:

- a. Mean
- b. Median
- c. Mode
- d. Range

5. Calculate the mean, median, mode, and range of the data represented by the following line plot:



- a. Mean
- b. Median
- c. Mode
- d. Range



6. Calculate the mean, median, mode, and range of the data represented by the following stem-and-leaf plot:

**RBI's for American League Leaders**

7	8	Key: 15 5 = 155
8		
9		
10	5 8 9 9 9	
11	6 4 2 2 8 8 9 3 7 8 9 9 2	
12	9 6 2 6 2 1 6 2 6 3 1 4 4 9 6	
13	0 9 9 3 4 2 3	
14	4 5 2 0 5 8 7	
15	5 9	

- a. Mean                                      b. Median                                      c. Mode                                      d. Range

7. Create a histogram for the following data with the number of dogs adopted on the horizontal axis and the number of months on the vertical axis.

**Number of Dogs Adopted from the Animal Shelter by Month**

Month	Number of dogs
January	8
February	15
March	18
April	11
May	9
June	20

Month	Number of dogs
July	12
August	9
September	7
October	11
November	9
December	24

## Week 4: Percents

### Resources:

<http://www.mathgoodies.com/lessons/percent/proportions.html>

[http://www.mathgoodies.com/lessons/percent/sale\\_price.html](http://www.mathgoodies.com/lessons/percent/sale_price.html)

<https://www.onlinemathlearning.com/compound-interest.html>

<http://www.mathgoodies.com/lessons/percent/commission.html>

[http://www.mathgoodies.com/lessons/percent/sales\\_tax.html](http://www.mathgoodies.com/lessons/percent/sales_tax.html)

<http://www.mathgoodies.com/lessons/percent/change.html>

1. Convert between percents and decimals in the table.

<b>Percent</b>		95%		2.021%		0.017%
<b>Decimal</b>	0.125		0.003		4.09	

2. On a recent test, 14 out of 56 students got an A. What percent of students got an A?

3. A survey found that 25% of the 312 students at Allentown High School bring their lunch from home. How many students bring their lunch from home?

4. 32 is 25% of what number?

5. The cafeteria has 246 oranges. At the end of lunch, they have 23 oranges left. What percentage of the 246 oranges are left at the end of lunch?

6. In a boutique, a \$14 scarf is on sale for 20% off. What is the sale price of the scarf?
  
  
  
  
  
  
  
  
  
  
7. In a bicycle store, a \$500 bicycle is marked with a sign that says, "Get a 30% discount plus an additional 10% off if you use your credit card." What is the final sale price of the bicycle?
  
  
  
  
  
  
  
  
  
  
8. Samantha deposited \$400 into a savings account that earned 4.5% interest per year. How much money did she have after 2.5 years if the interest is compounded annually?
  
  
  
  
  
  
  
  
  
  
9. Ed borrowed \$3,600 to finance a large-screen television at a rate of 6.25% for 4.75 years. How much interest will he pay if the interest is compounded annually?
  
  
  
  
  
  
  
  
  
  
10. A department store pays an interior designer a 25% commission for sales per month. How much will the department store have to pay the interior designer if her weekly sales are \$1,875 for 4 consecutive months?
  
  
  
  
  
  
  
  
  
  
11. If the sales tax rate is 7.25% in California, then how much tax should a merchant in California charge for the sale of a \$15 tote bag?

12. Amy bought a dress marked \$42 and then paid the store clerk a total of \$43.47. What was the sales tax rate?
  
  
  
  
  
  
  
  
  
  
13. If the sales tax rate is 7.5% in New York State, then how much was the original price for a pair of pants that cost \$36.55 after sales tax was included?
  
  
  
  
  
  
  
  
  
  
14. At Furnace Woods School, enrollment increased from 320 students in 2018 to 349 students in 2019. What is the percent change in enrollment?
  
  
  
  
  
  
  
  
  
  
15. Stock for Company XYZ decreased from \$14 per share to \$9 per share. What is the percent change in stock price?
  
  
  
  
  
  
  
  
  
  
16. The yearly tuition at a college increased from \$50,000 in 2018 to \$59,000 in 2019. What is the percent change in tuition?
  
  
  
  
  
  
  
  
  
  
17. The price of oil decreased from \$54 per barrel to \$50 per barrel. What is the percent change in oil prices?

## Week 5: Solving Equations and Inequalities (No Calculator)

### Resources:

<https://www.onlinemathlearning.com/solving-equations.html>

<https://www.onlinemathlearning.com/solving-multi-step-equations.html>

<https://www.onlinemathlearning.com/solving-inequalities.html>

<https://www.onlinemathlearning.com/multistep-inequalities.html>

For #1-9, solve the equation. Show your work. No calculators.

1.  $x + 7 = 5$

2.  $x - 9 = 4$

3.  $4x = 20$

4.  $\frac{1}{4}x = 5$

5.  $\frac{2}{3}x = -7$

6.  $2x - 3 = 9$

7.  $\frac{1}{2}x + 8 = 7$

8.  $\frac{3}{4}(x - 1) = 9$

9.  $5(x + 4) = 15$

For #10-15, solve the inequality. Show your work. No calculators.

10.  $x - 11 \leq 25$

11.  $x + 8 > -5$

12.  $3x < -24$

13.  $\frac{1}{3}x > 6$

14.  $-4x \geq 9$

15.  $-2x - 7 < 11$

For #16-18, solve the equation or inequality. Show your work. No calculators. I recommend using cross-multiplication on #16 (rewrite 4 as 4/1 first) and #18.

16.  $\frac{1}{n} = 4$

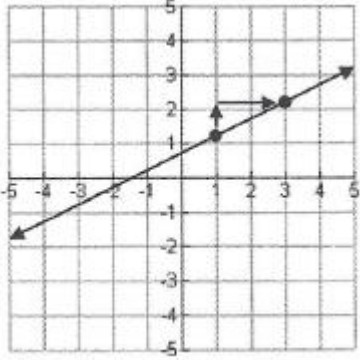
17.  $\sqrt{n} = 6$

18.  $\frac{2}{\sqrt{n}} = \frac{1}{5}$

## Week 6: Equations of Lines

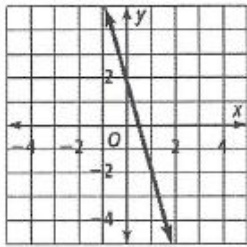
### Finding Slope ( $m$ )

$$m = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

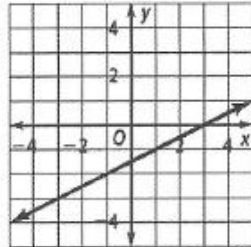
Finding Slope From A Graph	Finding Slope From 2 Points
 <p style="margin-top: 10px;"> <math>\Delta y = 1</math> (rise)  <math>\Delta x = 2</math> (run)  <math>m = \frac{1}{2}</math> </p>	<p>Example: Find the slope of the line between <math>(-2, 7)</math> and <math>(3, -1)</math>.</p> $m = \frac{-1 - 7}{3 - (-2)} = \frac{-8}{5}$ $m = -\frac{8}{5}$

For #1-8, find the slope of the following lines (pick 2 points on each line) or points.

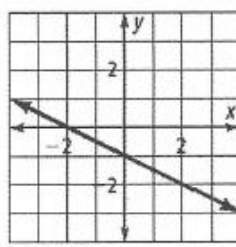
1.



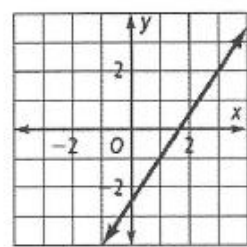
2.



3.



4.

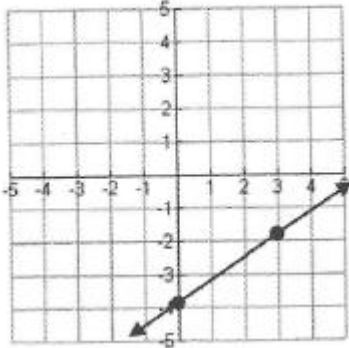
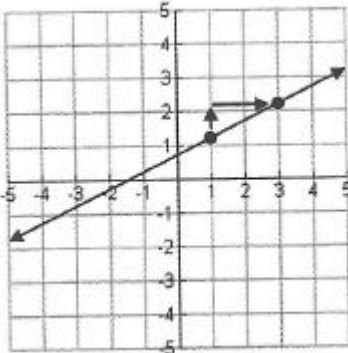


5.  $(8, 10)$  and  $(-7, 12)$

6.  $(-18, -2)$  and  $(8, -2)$

7.  $(5, -2)$  and  $(1, 6)$

8.  $(3, 7)$  and  $(3, -5)$

<p align="center"><b><u>Slope-Intercept Form</u></b></p> $y = mx + b$ <p><math>m</math> is the slope of the line  <math>b</math> is the <math>y</math>-intercept of the line</p>	<p align="center"><b><u>Point-Slope Form</u></b></p> $y - y_1 = m(x - x_1)$ <p><math>m</math> is the slope of the line  <math>(x_1, y_1)</math> is a point on the line</p>
<p>Example:  Graph <math>y = \frac{2}{3}x - 4</math>  <math>y</math>-intercept is <math>-4</math> or <math>(0, -4)</math>  Slope is <math>\frac{2}{3} \rightarrow</math> up 2, right 3</p> 	<p>Graph the point and then use the slope to graph more points (using rise over run).</p> <p>Example:  Graph <math>y - 1 = \frac{1}{2}(x - 1)</math>  Point: <math>(1, 1)</math>  Slope: <math>\frac{1}{2} \rightarrow</math> up 1, right 2</p> 

<p><b>Identifying the <math>x</math>- and <math>y</math>-intercepts</b></p>	
<p>The <math>x</math>-intercept is the point where the graph crosses the <math>x</math>-axis (where <math>y = 0</math>). Substitute <math>y = 0</math> to find the <math>x</math>-value of this point.  The <math>y</math>-intercept is the point where the graph crosses the <math>y</math>-axis (where <math>x = 0</math>). Substitute <math>x = 0</math> to find the <math>y</math>-value of this point.</p>	
<p>Example:  Find the <math>x</math>- and <math>y</math>-intercepts for <math>-3 = 3(x + 1)</math>.</p>	
<p align="center"><u><math>x</math>-intercept</u></p> Substitute in $y = 0$ : $0 - 3 = 3(x + 1)$ Solve: $-3 = 3(x + 1)$ Distribute 3 through to $x + 1$ : $-3 = 3x + 3$ Subtract 3 from both sides: $-6 = 3x$ Divide both sides by 3: $x = -2$ $x$ -intercept: $(-2, 0)$	<p align="center"><u><math>y</math>-intercept</u></p> Substitute in $x = 0$ : $y - 3 = 3(0 + 1)$ Solve: $y - 3 = 3(1)$ Simplify on the right-hand side: $y - 3 = 3$ Add 3 to both sides: $y = 6$  $y$ -intercept: $(0, 6)$

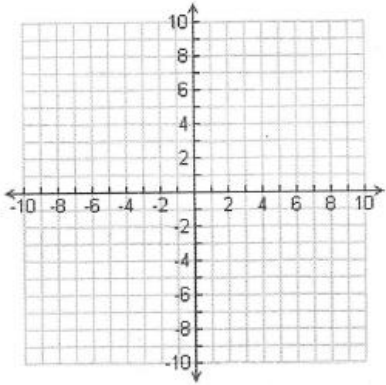


For #9-14, find the requested information and graph the equation.

9.  $y = -2x - 1$

Slope: \_\_\_\_\_

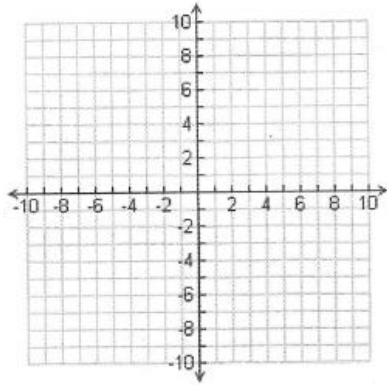
y-intercept: (\_\_\_\_, \_\_\_\_)



10.  $y = 3x - 2$

Slope: \_\_\_\_\_

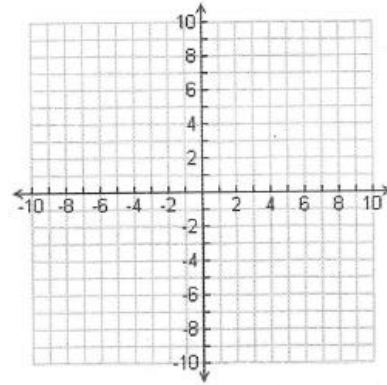
y-intercept: (\_\_\_\_, \_\_\_\_)



11.  $y = -\frac{2}{3}x + 4$

Slope: \_\_\_\_\_

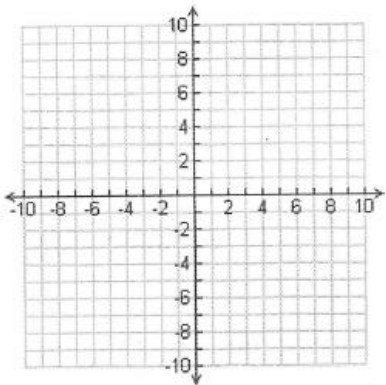
y-intercept: (\_\_\_\_, \_\_\_\_)



12.  $y - 1 = \frac{2}{3}(x + 4)$

Slope: \_\_\_\_\_

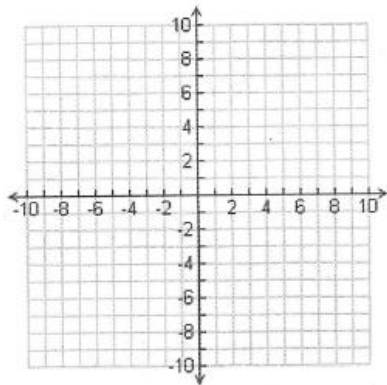
Point: (\_\_\_\_, \_\_\_\_)



13.  $y + 2 = -2(x - 1)$

Slope: \_\_\_\_\_

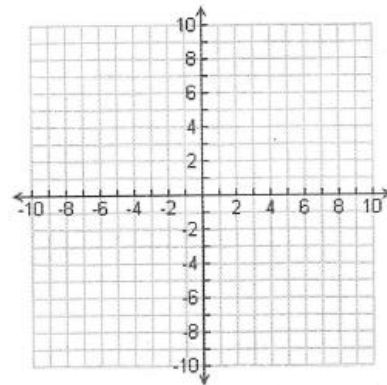
Point: (\_\_\_\_, \_\_\_\_)



14.  $y + 3 = \frac{5}{3}(x + 8)$

Slope: \_\_\_\_\_

Point: (\_\_\_\_, \_\_\_\_)



For #15-17, find the intercepts of the equation. Show your work (substitute 0 in for  $x$  or  $y$  and solve for the other variable).

15.  $x + y = 7$

x-intercept: (\_\_\_\_, \_\_\_\_)

y-intercept: (\_\_\_\_, \_\_\_\_)

16.  $2x - y = 8$

x-intercept: (\_\_\_\_, \_\_\_\_)

y-intercept: (\_\_\_\_, \_\_\_\_)

17.  $3x - 4y = 10$

x-intercept: (\_\_\_\_, \_\_\_\_)

y-intercept: (\_\_\_\_, \_\_\_\_)