**Pop Quiz #1**

MAT 120

June 7th 2018

Instructions: Break up into groups of two or three. You are allowed to work together, but everyone should turn in a separate sheet. You may use your notes or text. Be sure to show all of your work. *NOTE: THIS WILL BE GRADED AS QUIZ AND INCLUDED IN THE QUIZ PORTION OF YOUR OVERALL GRADE.*

**Part 1**

Instructions: You are given the following universal set **U** and the sets **St**, **Tar** and **Tul** defined on **U**.

**U** = {*Arya, Brynden, Catelyn, Daenarys, Edmure, Jon, Robb, Rhaegar, Sansa, Varys, Margie* }

**St** = {*Arya, Sansa, Catelyn, Jon, Robb*}

**Tar** = {*Daenarys, Rhaegar, Jon* }

**Tul** = {*Catelyn, Edmure, Brynden* }

1. Create a Venn Diagram of all three sets. Label the different regions by the set operations you used to find the members of that region.

2. Find n ( **St** ∨ **Tar** ) .

a. Does this equal n ( **St** ) + n ( **Tar** ) ? Why or why not?

3. List the members of **P**( **Tul** ) in Roster Notation, then state the cardinality of **P**( **Tul** ).

4. Illustrate *De Morgan's Second Distributive Law* by showing either side of the following equation is the same,

~ ( **Tul** ∧**Tar** ) (~ **Tul** ) ∨ (~**Tar**)

*Hint*: We went over the *first* distributive law in class! It's a similar process!

a. Shade in the region given by *De Morgan's Second Distributive Law* on your Venn Diagram.

5. Find **Tar –** **Tul.**

a. Why does **Tar – Tul Tar** ?

*Hint*: Look at the intersection of **Tar** and **Tul** !

**Part 2**

Instructions: For the following sets given in Set Builder notation, list the first five elements of the set in Roster Notation. Then describe in plain English what this set represents.

6.

7.

8.

**Part 3**

Instructions: Determine the type of relation between each pair of sets in the given problems, i.e. are the sets disjoint, overlapping, complements or subsets? Draw a Venn Diagram of the scenario.

9.

Set **A**: The set of people who love math.

Set **B**: The set of people who hate math.

a. Using the symbol ("*is an element of*"), write what set you belong to.

10.

Set **A**: The set of all two legged creatures.

Set **B**: The set of all hairy creatures.

11.

Set **A**: The set of US Governors.

Set **B**: The set of US Presidents.

*Hint*: Bill Clinton was governor of Arkansas.

12.

Set **A:** The set of cities in the United States.

Set **B**: The set of cities in New York State.

**Extra Credit**

(*Lucky Number*) 13. Go back up to Part 1 and add into the conflagration the following set,

**ALIVE** = { *Arya, Daenarys, Jon, Edmure, Sansa, Varys*}

Now make a Venn Diagram of all four sets.

*Hint*: If you are clever, you can just redraw your Venn Diagram from *Part 1* and add a circle around certain elements to get what you need. (You might have to deform the circle to get it to fit!)