

Please complete this worksheet by **September 20th, 2021** by **11:59pm**.

Once you upload a picture of your work ([here](#)), the solutions will become available so you can study for the weekly quizlet, which may draw one problem from this week's worksheets.

Problem 1

Let M be the universe of all movies. Let A be the set of all animated movies. Let D be the set of Disney movies. Let $L(m)$ be the predicate that I like a movie m . Let $V(m)$ be the predicate that the movie contains violence. Translate the following sentences to a mathematical representation.

- (a) There exists an animated movie that is not a Disney movie.
- (b) I like all Disney movies.
- (c) There exists a violent animated movie that I do not like.
- (d) All movies that are not Disney movies either contain violence or I like them.

Problem 2

A prime number is defined as an integer greater than 1 whose only positive integer factors are itself and 1. Write the definition of a prime number using quantifiers. Begin your definition with the words "A number p is prime if and only if ...". Use \mathbb{Z} , the set of integers, for your universe, and use the predicate $F(m, n)$ that states that m is a factor of n .

Problem 3 (optional, but extra practice if you want!)

Pick one of Lewis Carroll's logic puzzles from [this list](#) and convert it into a mathematical representation, similar to the [hummingbird example in the lecture notes/video](#).

If you want to try your hand at deduction (which we will see next class), the answers to the Lewis Carroll puzzles are at the [bottom of this page](#).