## Math 2534 Homework 3 Quantifiers Spring 2018

Follow the homework requirements **or points will be taken off**. In particular, stable multiple sheets.

## Problem 1:

- A) Put the following sentences in symbolic logic using a single quantifier.
  - a) Any child will play with trains
  - b) Not all students read the text book.
  - c) Everyone has a favorite movie.
- B) Negate b) in Part A symbolically and then convert to a natural English sentence.

Problem 2:	Convert the	logic sta	tement into	natural	conversational	English
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a)	Domain D: all professors	b) Domain B: all VT students
	Predicate $O(x) = x$ holds office hours.	Predicate $H(x) = x$ does homework
	$\forall x, x \in D \to O(x)$	$\exists x  \big   x \in B \land \sim H(x)$

## Problem 3: (You may put answer for this problem on this sheet)

Given the following domains and predicate, put each symbolic statement into natural conversational English.

Domain S: all student ( x = an arbitrary student ) Domain M: all math classes (y = arbitrary math class ) Predicate: P(x,y) = x will register for y

- 1)  $\forall y, y \in M \rightarrow [\exists x \mid x \in S \land P(x, y)]$
- 2)  $\exists x \mid x \in S \land [\forall y, y \in M \rightarrow P(x, y)]$

3) 
$$\exists y | y \in M \land [\forall x, x \in S \rightarrow P(x, y)]$$

4)  $\forall x, x \in S \rightarrow [\exists y | y \in M \rightarrow P(x, y)]$ 

**Problem 4:** Put the following arguments into symbolic logic and determine their validity. (Justify your reasoning using sentences. State the **domain** and the **implied quantifier**)

- A) No good child will miss out on a treat. Billy is a good child. Therefore Billy got a treat.
- B) No good child will miss out on a treat. Amanda is not good child. Therefore Amanda did not get a treat.
- C) No good child will miss out on a treat. Liang did not get a treat. Therefore Liang was not a good child.
- D) No good child will miss out on a treat. Dinesh got a treat Therefore Dinesh is a good child.