

## Math 301 Assignment 2

These problems are due in class on Tuesday. If your homework takes up multiple pages, they must be stapled together. Your work must be legible, and any frills from notebook paper must be removed.

### Book Exercises

Section 1.4 # 2, 6, 8, 10, 16, 32, 36

Section 1.5 # 4, 30

Section 1.7 # 6\* (Due Friday in class for 5 points), 14, 16, 26, 38

Section 2.3 # 8, 10, 12, 30, 56, 64

### Additional Exercises

#1: Three logicians are going to the movies together. The theater is showing four films: *A Simple Favor*, *Crazy Rich Asians*, *Searching*, and *Venom*.

Logician #1: "I want to see *A Simple Favor* and *Searching*."

Logician #2: "I want to see *Crazy Rich Asians* and *Venom*."

Logician #3: "I want to see *Crazy Rich Asians*, *Searching*, and *Venom*."

Let  $L$  be the set of the three logicians and  $M$  be the set of the four movies.

The predicate  $P(x, y)$  means "Logician  $x$  wants to see movie  $y$ ". The predicate  $x \neq y$  means that  $x$  and  $y$  are not the same logician.

Translate the following statements into English, then determine whether they are true or false.

- a.  $\forall x \in L \exists y \in M, P(x, y)$
- b.  $\exists x \in L \forall y \in M, P(x, y)$
- c.  $\forall y \in M \exists x \in L, P(x, y)$
- d.  $\exists y \in M \forall x \in L, P(x, y)$
- e.  $\forall x \in L \forall y \in L \exists z \in M, [P(x, z) \wedge P(y, z)]$
- f.  $\forall x \in L \exists y \in L \exists z \in M, [x \neq y \wedge P(x, z) \wedge P(y, z)]$

## Practice Problems

(Don't turn these in. Answers are in the back of the book. \*Problems with an asterisk are more challenging if you want a deeper understanding of the material.)

Section 1.4: # 1, 5, 7, 9, 13, 15, 33, 35, 43\*, 45\*, 51\*

Section 1.5: # 1, 3, 27, 33, 37, 39\*

Section 1.7: # 1, 3, 5\*, 7\*, 15, 27

Section 2.3: # 9, 31, 57, 63, 65