Quiz 3: Sections 1.3-1.4

1. (4 points) In the domain of all books, consider the following predicates.

$$H(x)= \text{``}x \text{ is heavy.''}$$
$$C(x)= \text{``}x \text{ is confusing.''}$$

Translate the following statements from predicate logic into ordinary English or vice versa.

(a) All heavy books are confusing.

(b) Some books are confusing and heavy.

(c) $(\forall x)(C(x) \vee H(x))$

(d) $(\exists x)(H(x) \wedge \neg C(x))$

2. (3 points) The domain for this problem is some unspecified collection of numbers. Consider the predicate

$$P(x, y)= \text{``}x \text{ is greater than } y.\text{''}$$

(a) Translate the following statement into predicate logic.

Every number has a number that is greater than it.

(b) Negate your expression from part (a), and simplify it so that no quantifier or connective lies within the scope of a negation.

(c) Translate your expression from part (b) into understandable English. Don't use variables in your English translation.

3. (3 points) Draw a model for the axiomatic system of four-point geometry, where a "line" is a line segment, a "point" is an endpoint of a line segment, and a point "is on" a line if it is one of its endpoints.