Homework 1

Math 105

Due June 26th at 11:59 PM

Textbook Exercises

1.1: 1, 2, 3, 4, 5, 6, 31, 32

1.2: 1, 2, 5, 6, 8, 9, 11, 12, 13, 35, 40, 41

1.3: 1, 4, 7, 9, 13, 16, 20, 21, 28, 41, 48

Exercise 1: Consider the following argument:

1. All chairs are furniture.
2. Some furniture is blue.
3. No blue objects are tables.

Conclusion: no chairs are tables.

a) Is this argument using inductive or deductive reasoning? Explain.

b) Is the argument valid? If it is, draw a Venn diagram proving that, and if not, draw a Venn diagram demonstrating a counterexample.

c) Change **one word** in statement 2 so that the validity of the argument changes — so if you found that it was valid before, make it invalid, and vice versa.

Exercise 2: Let p be the statement *all chairs are furniture*, q the statement *no furniture is blue*, r the statement *some blue objects are tables*, and s the statement *no chairs are tables*. Note that these aren't quite the same statements as in exercise 1.

a) Write the argument from exercise 1 as a symbolic expression in terms of p, q, r, and s.

b) Write a truth table for the expression you found in the previous part.

c) Use the fact that $x \longrightarrow y$ is equivalent to $\sim x \vee y$ to rewrite the statement from part a) without using an implication. Simplify as much as you can.