Math 220 – Homework 1

Due Wednesday 01/27 at the beginning of class

PART A

Problems from the textbook:

- Section 1.1 # 1(b,c,f,h,i,k);

- Section 1.4 # 8,9,10.

PART B

1. State the negation for each of the following statements.

   (a) $\sqrt{3}$ is a rational number.

   (b) 0 is not a negative number.

   (c) The real number r is at most $\sqrt{3}$

   (d) Two sides of a triangle have the same length.

   (e) The point P on the plane lies outside of the circle C.

2. In each of the following statements identify the hypothesis (assumption) and conclusion. Represent your answers in the following form:

   Hypothesis:

   Conclusion:

   (a) If a is irrational, then $2a$ is irrational.

   (b) a^3 is an even integer whenever a is an even integer.

   (c) In order to pass the drivers test, the candidate must be able to parallel park.

3. Consider the statements: $P : 2016 \in 5\mathbf{Z}$, and $Q : 2016 \in \mathbf{E}$. Write each of the following statements in words and indicate whether it is true or false.

   (a) P;   (b) Q;   (c) $\neg P$;   (d) $P \vee Q$;   (e) $P \wedge Q$;   (f) $P \Rightarrow Q$.

4. Write the following statement using "if, then":

   "A sufficient condition for a triangle to be isosceles is that it has two equal angles."

5. For the open sentence $P(x) : 3x - 2 > 4$ over the domain $\mathbf{Z}$, determine:

   (a) the values of x for which $P(x)$ is a true statement.

   (b) the values of x for which $P(x)$ is a false statement.

6. For the open sentence $P(x) : x(x - 1) = 6$ over the domain $\mathbf{R}$, determine:

   (a) the values of x for which $P(x)$ is a true statement.

   (b) the values of x for which $P(x)$ is a false statement.