MATH 3200: PROBLEMS FOR QUIZ #1

Quiz #1 will be given on Wednesday, 1/22, during the first 10 minutes of class. It will consist of three questions designed to quickly check your understanding of Chapter 1. **The three questions will be taken from the following list.** I will be happy to discuss proposed answers to these questions during the Tuesday, 1/21 office hour.

1. What is a "**statement**" ?

2. What is the **contrapositive** of the implication $P \Rightarrow Q$? the **inverse** ? the **converse** ?

3. When are two statements said to be **logically equivalent** ?

4. Write out the complete truth table for $P \vee Q$.

5. TRUE or FALSE: If everyone in our class is more than six feet tall, then 1+1=2.

6. Write out the complete truth table for $\neg(P \wedge Q)$.

7. Using truth tables, show that $P \wedge (\neg Q)$ is logically equivalent to $\neg(P \Rightarrow Q)$.

8. Negate the following statement using the rules discussed in class: In every triangle, the sum of the interior angles is 180˚. (Do not simply write "It is not the case that…")

9. Negate the following statement using the rules discussed in class: Every integer is a multiple of both 1 and -1.

10. Negate the following statement using the rules discussed in class: For every pair of integers x and y, if $x^2 + y^2$ is a multiple of 3, then $x^2 + y^2$ is a multiple of 9.
    [*Hint*: You showed in Problem 7 above that the negation of "If P, then Q" is "P and not Q".]

11. Consider the following statement: $(\forall x \in \mathbf{R})\ (\exists y \in \mathbf{R})\ (x > y)$.
    First, decide whether it is TRUE or FALSE. Then write out its negation.