Printed Name _____ Signature _____

Analysis Quiz #1

Show your work and clearly label your answers on this quiz. *No scrap paper, calculators, or notes are allowed* (or needed). This quiz is scored out of 45 points. (There are 50 points possible.) You have 30 minutes to complete the quiz.

To get credit on a problem, you *must* give a clear, well-written explanation, justifying each step you take with an appropriate proposition from class or one of the books.

Problem 1 (10+5+5 pts)

(a) Give a truth table evaluating the statement $(P \vee \neg Q) \implies Q$.

(b) Is $(P \vee \neg Q) \implies Q$ a valid statement? Explain your answer.

(c) Is $(P \vee \neg Q) \implies Q$ a satisfiable statement? Explain your answer.

Problem 2 (3+3+4 pts)

(a) Rewrite the English statement using logical notation.

(b) Give the negation of the statment using logical notation.

(c) Rewrite the negation given in (b) in English.

(Hint: Make sure the negation in English makes sense *and* matches the notation.)

There exists a real number x that is not beautiful.

Problem 3 (10 pts) Write the statement using logical notation. Prove or disprove the statement.

If a rational number q is an integer, then q can be written as a fraction of integers with denominator 5.

Problem 4 (10 pts) Write the statement using logical notation. Prove or disprove the statement.

If a rational number q can be written as a fraction of integers with denominator 5, then q is an integer.