Examlet 1a Foundations of Advanced Math 2/2/07

1. a) State the definition of an odd integer.

b) Is the statement "$(\forall x \in \mathbb{R})(\exists y \in \mathbb{R})(x \cdot y = 3)$" true or false? Support your answer.

2. a) Make a truth table for the statement $P \wedge Q$.

b) Determine whether the propositional $(P \vee Q) \Rightarrow R$ is equivalent to $(P \Rightarrow R) \vee (Q \Rightarrow R)$.

3. Show that if n is an integer for which n^3 is odd, then n is odd.

4. Show that if x is rational and y is irrational, then $x + y$ is irrational.

5. Show that $(\forall n \in \mathbb{N}, n \geq 4)(n! > 2^n)$.