Math 421-001 **Homework Assignment #1** **Due Jan. 14, 2015**

Name _____

1. Negate the following statements:
   (a) It rains every Wednesday.
   (b) If Wednesday is rainy then the following Thursday is snowy.
   (c) For every $\varepsilon > 0$ there exists a δ such that $|x - y| < \delta$ implies $|f(x) - f(y)| < \varepsilon$.
   (d) $\forall \varepsilon > 0$ there exists P, a partition of $[a, b]$ such that $U(f, P) - L(f, P) < \varepsilon$.

2. (5.1.1. b) Compute $U(f, P)$ and $L(f, P)$, where $P\left\{0, \frac{1}{2}, 1, 2\right\}$ and $f(x) = 3 - x^2$.

3. Prove the following

   Theorem. (Approximation Property for Infima) If the set $E \subset \mathbb{R}$ has a finite infimum and $\varepsilon > 0$ is any positive number, then there is a point $a \in E$ such that

$$\inf E \leq a < \inf E + \varepsilon.$$