Assignment 1

1. a) The smallest prime number can either be 2 or not 2, making "The smallest prime number is 2" a valid statement.

   b) The sum of $\cos^2\theta$ and $\sin^2\theta$ could be 1 or not 1, so "$\cos^2\theta + \sin^2\theta = 1$" is a valid statement.

   c) It is either possible for every integer to be of the form $2k$ or $2k+1$ or there exists at least one exception, so "Every integer x is of the form $2k$ or $2k+1$" is a valid statement.

   d) 0 can either be even or odd or it could not be either, making "The number 0 is neither even nor odd" a valid statement.

   e) A question is not true or false; therefore, "Is 3 ¿ 2 true?" is not a valid statement.

2. a) $\forall x \in \mathbb{Z}, x^2 > 0$ b) $\forall x \in \mathbb{R}, x^3 \in \mathbb{R}$

3. a) $\exists x \notin \mathbb{Z}, \forall y \notin \mathbb{R}, x + 2y > 3\sqrt{2}$ b) $\forall a \notin \mathbb{N}, \exists b \notin \mathbb{Q}$