Practice Test
Transition to advanced mathematics
Spring 2016

1) Define the following terms:

- Well-defined
- Surjective
- Set
- Subset
- Disjunction
- Indexed set

2) Show that this function is injective:

$$f: \mathbb{R} \to \mathbb{R}$$
$$x \mapsto 3x + 2$$

3) Translate the following sentence into mathematical symbols:

"Every house has key that opens the front door"

4) Translate the following statement into an English sentence:

$$\exists_{x \in \mathbb{R}} \forall_{y \in \mathbb{R}} (xy = 0)$$

5) Prove or disprove that $\exists_{x \in \mathbb{R}} \forall_{y \in \mathbb{R}} (xy = 0)$

6) Find the following:

$$\bigcup_{n=2}^{7} \left[\frac{1}{n}, 2n\right]$$

7) Prove or disprove that if x is irrational then x^3 is odd, for all integers x.