

# Math 2283 - Introduction to Logic

## Quiz #2 - 2015.08.28 Solutions

---

1. Determine if the following quantified statements are true or false.

(a)  $\mathbf{E} \mathbf{A}_{x,y} x \leq y$

This statement is false, there is no 'smallest' real number.

(b)  $\mathbf{E} \mathbf{A}_{x,y} x \geq y$

This statement is false, there is no 'greatest' real number.

(c)  $\mathbf{A} \mathbf{E}_{x,y,z}$  If  $x \neq y$ , then  $x < z < y$

This statement is false, between any two distinct real numbers, one can find another real number, but what if  $x > y$ ?

2. Repeat problem 1, only this time, let the universe of discourse be the whole numbers  $\mathbb{W} = \{0, 1, 2, 3, \dots\}$ . Determine if the following quantified statements are true or false.

(a)  $\mathbf{E} \mathbf{A}_{x,y} x \leq y$

This statement is true,  $x = 0$  is the only value which works, but it does.

(b)  $\mathbf{E} \mathbf{A}_{x,y} x \geq y$

This statement is false, there is no 'greatest' whole number.

(c)  $\mathbf{A} \mathbf{E}_{x,y,z}$  If  $x \neq y$ , then  $x < z < y$

This statement is still false.