

Fall 2016 COT 3100 Section 1 Quiz #1

Name: _____

Lab Section: 11 12 13 18 19 21 22

1) (2 pts) Prove or disprove the following statement over the universe of real numbers for both x and y :

$$\forall y \exists x [xy = 1]$$

2) (8 pts) Using the following given propositions and the rules of inference, prove the conclusion below the dotted line:

$$\begin{array}{l} (p \wedge q) \rightarrow r \\ (t \vee s) \rightarrow p \\ s \rightarrow v \\ t \wedge \bar{v} \\ t \rightarrow q \\ \hline r \end{array}$$

3) (5 pts) In class you were shown a proof that the square root of 2 is irrational. Explain why the same steps for this proof are valid in showing that the square root of 3 is irrational, but fail when trying to show that the square root of 4 is irrational.

4) (5 pts) Use a direct proof to show that if an integer n is odd, then there exists some integer c such that $n^2 = 4c + 1$.

5) (5 pts) Prove that $n(n + 1)$ is even via proof by contradiction. In your proof, use the fact that the difference between two distinct odd numbers must be 2 or greater.