

Fall 2016 COT 3100 Exam #1

Last Name: _____ , **First Name :** _____

Lab Section: 11 12 13 18 19 21 22

Note: Even though each question is worth 12 points, some of the responses required for full credit may be much shorter or longer than other responses require for full credit. Part of the reason for this is to not give away whether you are to prove or disprove the given claims. (Disproofs tend to be shorter and part of what I am testing is whether or not you can correctly gauge the validity of a claim. I don't want the number of points a question is worth to give away whether the claim is true or false.)

1) (12 pts) Prove or disprove the following statement over the universe of all real numbers for x and y : $\exists x \forall y [y^2 - 6y + x \geq 0]$.

2) (12 pts) Prove or disprove the following assertion for finite sets A, B and C:

$$A \times (B \cap C) = (A \times B) \cup (A \times C)$$

3) (12 pts) Use the laws of implication to prove the conclusion shown from the following premises:

$$(p \vee q) \rightarrow (t)$$

$$s \rightarrow (r \vee p)$$

$$u \rightarrow (\bar{r} \vee q)$$

$$v \rightarrow (s \wedge u)$$

v

t

Note: You may not use all of the rows shown below.

Step	Reason
1.	
2.	
3.	
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4) (12 pts) Prove or disprove the assertion below for finite sets A and B. (Note: $\wp(A)$ denotes the power set of A.)

$$\wp(A) \cup \wp(B) = \wp(A \cup B)$$