

Spring 2020 COT 3100 Section 2 Quiz #1

Name: _____

Please circle your lab section

Lab Section: 11(T4:30)

12(R4:30)

13(R5:30)

14(F3:30)

15(F8:30)

16(F 9:30)

17(F 12:30)

1) (10 pts) Using the Laws of Logic, show that the following two logical expressions are equivalent:

(a) $(p \vee ((p \vee q) \wedge (p \vee \bar{q}))) \vee (\bar{q} \wedge (q \rightarrow r))$

(b) $p \vee \bar{q}$

2) (8 pts) Casey drove a total of 100 miles. For the first portion of the trip she averaged 40 miles per hour and for the second/last portion of the trip she averaged 55 miles per hour. If her average speed for the entire trip was 50 miles an hour, how long (in miles) was the first portion of her trip? Please express your answer as a fraction in lowest terms.

3) (7 pts) Disprove the following statement over the universe of positive real numbers (for both x and y):

$$\forall x[\exists y\left[\frac{1}{x} + \frac{1}{y} = 1\right]]$$

Determine a more restricted (proper subset) universe of numbers for which the statement would be true. Full credit is given only if the given universe is "maximal."