Fall 2019 COT 3100 Section 2 Quiz #1

Name: _____

Lab Section: 18(R9) 19(R10) 20(R11) 21(T2) 22(T3) 23(T4) 24(T5)

1) (9 pts) Using the Laws of Logic **only**, prove the Modus Tollens Rule of Inference. Namely, prove that the following expression is a tautology:

$$[(p \rightarrow q) \wedge \bar{q}] \rightarrow \bar{p}$$

2) (7 pts) Let r_1 and r_2 be the roots of the quadratic equation $x^2 + 9x + 5 = 0$. What is the value of $\frac{r_1}{r_2} + \frac{r_2}{r_1}$?

3) (9 pts) Using the following given propositions and the rules of inference, prove the conclusion below the dotted line. Note: You may not use all the slots given to you below.

$$(p \vee q) \rightarrow (s \vee t)$$
$$t \rightarrow (u \wedge v)$$
$$s \rightarrow p$$
$$q \vee r$$
$$\bar{r}$$
$$\bar{p}$$

$$u$$

Number	Deduction	Rule + Previous Steps Utilized
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

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