

Name: _____

Pid: _____

1. (10 points) Derive $(A \wedge B) \Rightarrow C$ from $A \Rightarrow (B \Rightarrow C)$ using natural derivations.

Solution:

1		$A \Rightarrow (B \Rightarrow C)$	
2			
3			
4			
5			
6			
7			

$A \wedge B$

A

$B \Rightarrow C$

B

C

$(A \wedge B) \Rightarrow C$

$\wedge E, 2$

$\Rightarrow E, 1, 3$

$\wedge E, 2$

$\Rightarrow E, 4, 5$

$\Rightarrow I, 1-6$

2. (10 points) Derive $A \vee B$ from $X \vee A$ and $\neg X \vee B$ using natural derivations.

Solution:

1		$x \vee A$	
2		$\neg x \vee B$	
<hr/>			
3			A
<hr/>			
4			$A \vee B$ $\vee I, 3$
5			x
<hr/>			
6			
<hr/>			$\neg x$
7			\perp $\neg E, 6$
8			$A \vee B$ $\perp E, 7$
9			B
<hr/>			
10			$A \vee B$ $\vee I, 9$
11		$A \vee B$	$\vee E, 2, 6-10, 10-9$
12	$A \vee B$		$\vee E, 1, 3-4, 5-11$