

Exercise 3:

1. $p \Rightarrow p$

p	$p \Rightarrow p$
0	1
1	1

2. $p \Rightarrow (q \Rightarrow p)$

q	p	$q \Rightarrow p$	$p \Rightarrow (q \Rightarrow p)$
0	0	1	1
1	0	0	1
0	1	1	1
1	1	1	1

$\text{True } A \Rightarrow B = \neg A \vee B$

3. $(p \Rightarrow q) \Rightarrow ((q \Rightarrow r) \Rightarrow (p \Rightarrow r))$

p	q	r	$p \Rightarrow q$	$q \Rightarrow r$	$p \Rightarrow r$	$(q \Rightarrow r) \Rightarrow (p \Rightarrow r)$	$(p \Rightarrow q) \Rightarrow ((q \Rightarrow r) \Rightarrow (p \Rightarrow r))$
0	0	0	1	1	1	1	1
0	0	1	1	1	1	1	1
0	1	0	1	0	1	1	1
0	1	1	1	1	1	1	1
1	0	0	0	1	0	0	1
1	0	1	0	1	1	1	1
1	1	0	1	0	0	1	1
1	1	1	1	1	1	1	1

True

4. $(p \Rightarrow q) \Rightarrow ((p \Rightarrow r) \Rightarrow q) \Rightarrow q$

p	q	r	$p \Rightarrow q$	$p \Rightarrow r$	$(p \Rightarrow r) \Rightarrow q$	$((p \Rightarrow r) \Rightarrow q) \Rightarrow q$	$(p \Rightarrow q) \Rightarrow ((p \Rightarrow r) \Rightarrow q) \Rightarrow q$
0	0	0	1	1	0	1	1
0	0	1	1	1	0	1	1
0	1	0	1	1	0	1	1
0	1	1	1	1	1	1	1
1	0	0	0	0	1	0	1
1	0	1	0	1	0	1	1
1	1	0	1	0	1	0	1
1	1	1	1	1	1	1	1

True