1	0
$\alpha \wedge \beta$	
α	
β	

1	0
	$\alpha \wedge \beta$
#1:	α
#2:	β

1	0
$\alpha \vee \beta$	
#1: α	
#2: β	

1	0
	$\alpha \vee \beta$
	α
	β

1	0
$\alpha \to \beta$	
#1:	α
#2: β	

1	0
$\star$	$\alpha \to \beta$

$\downarrow$ (introduce a new world)

1	0
α	β
$\star$	

1	0
$\sim\alpha$	
	α

1	0
$\star$	$\sim\alpha$

$\downarrow$

1	0
α	
$\star$	

1. Show that the formulas below are intuitionistic tautologies.

   - $p \to p$
   - $p \to \sim\sim p$ (What about $\sim\sim p \to p$?)
   - $\sim p \to \sim\sim\sim p$

2. Using the method of analytic tables, decide whether the following formulas are intuitionistic tautologies.

   (a) $p \vee \sim p$

   (b) $p \to \sim\sim p$

   (c) $\sim\sim p \to p$

   (d) $(p \to q) \vee (q \to p)$

   (e) $q \vee (q \to (p \vee \sim p))$