

# Assignment 3 Solutions

Ernest Musafiri Mastaki  
Introduction to Mathematical Thinking

**Answer 1** Let  $D$ : Dollar is strong,  $Y$ : Yuan is strong,  $T$ : Trade agreement signed.

(a)  $\top \Rightarrow (D \wedge Y)$

(b)  $D \Rightarrow \neg Y$

(c)  $\neg D \Rightarrow \neg T$

(d)  $T \Rightarrow \neg(D \wedge Y)$

(e)  $T \Rightarrow (\neg D \wedge Y)$

(f)  $T \Rightarrow (Y \Rightarrow \neg D)$

(g)  $T \Rightarrow (D \Leftrightarrow Y)$

(h)  $\top \Rightarrow [(D \vee Y) \wedge \neg(D \wedge Y)]$

**Answer 2** Truth table:

$\phi$	$\neg\phi$	$\psi$	$\phi \Rightarrow \psi$	$\neg\phi \vee \psi$
$T$	$F$	$T$	$T$	$T$
$T$	$F$	$F$	$F$	$F$
$F$	$T$	$T$	$T$	$T$
$F$	$T$	$F$	$T$	$T$

**Answer 3**  $\phi \Rightarrow \psi$  is equivalent to  $\neg\phi \vee \psi$

**Answer 4** Truth table:

$\phi$	$\psi$	$\neg\psi$	$\phi \Rightarrow \psi$	$\phi \not\Rightarrow \psi$	$\phi \wedge \neg\psi$
$T$	$T$	$F$	$T$	$F$	$F$
$T$	$F$	$T$	$F$	$T$	$T$
$F$	$T$	$F$	$T$	$F$	$F$
$F$	$F$	$T$	$T$	$F$	$F$

**Answer 5**  $\phi \not\Rightarrow \psi$  is equivalent to  $\phi \wedge \neg\psi$