

# Assignment\_02

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2.

p	not p	not (not p)
T	F	T
F	T	F

so p and not not p are logical equivalent.

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4.

a)

p	q	r	p or q	q or r	(p or q) or r	p or (q or r)
T	T	T	T	T	T	T
T	T	F	T	T	T	T
T	F	T	T	T	T	T
T	F	F	T	F	T	T
F	T	T	T	T	T	T
F	T	F	T	T	T	T
F	F	T	F	T	T	T
F	F	F	F	F	F	F

b)

p	q	r	p and q	q and r	(p and q) and r	p and (q and r)
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	T	F	F	F	F
T	F	F	F	F	F	F
F	T	T	F	T	F	F

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6.

**Solution:** We construct the truth table for these compound propositions in the following table .  
 Because the truth value of  $\text{not } (p \text{ and } q)$  and  $\text{not } p \text{ or not } q$  agree , they are logically equivalent .

p	q	p and q	not p	not q	not ( p and q )	not p or not q
T	T	T	F	F	F	F
T	F	F	F	T	T	T
F	T	F	T	F	T	T
F	F	F	T	T	T	T

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8.

a) Lwame will not take a job in industry and go to graduate school .

b) Yoshiko does not know Java or calculus .

c) James is not young or strong .

d) Rita will not move to Oregon and Washington .

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10.

a)

p	q	p or q	not p and ( p or q )	not p and ( p and q ) -> q
T	T	T	F	T
T	F	T	F	T
F	T	T	T	T
F	F	F	F	T

Either way ,  $\text{not } p \text{ and } ( p \text{ and } q ) \rightarrow q$  is always true .

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14.

Proof :

$( \text{not } p \text{ and } ( p \rightarrow q ) ) \rightarrow \text{not } q$

$= [ \text{not } ( \text{not } p \text{ and } ( \text{not } p \text{ or } q ) ) ] \text{ or not } q$

$$= (p \text{ or } \text{not} ( \text{not } p \text{ or } q ) ) \text{ or } \text{not } q$$

$$= (p \text{ or } p \text{ and } \text{not } q) \text{ or } \text{not } q$$

$$= (p \text{ and } \text{not } q) \text{ or } \text{not } q$$

$$= (p \text{ or } \text{not } q) \text{ and } ( \text{not } q \text{ or } \text{not } q )$$

$$= (p \text{ or } \text{not } q) \text{ and } \text{not } q$$

When  $q$  is true ,  $\text{not } q$  is false .  $(p \text{ or } \text{not } q) \text{ and } \text{not } q$  must be false .

16.

$p$	$q$	$p \text{ and } q$	$\text{not } p$	$\text{not } q$	$\text{not } p \text{ and } \text{not } q$	$(p \text{ and } q) \text{ or } (\text{not } p \text{ and } \text{not } q)$	$p \leftrightarrow q$
T	T	T	F	F	F	T	T
T	F	F	F	T	F	F	F
F	T	F	T	F	F	F	F
F	F	F	T	T	T	T	T

18.

**Proof:**

$$\text{not } q \rightarrow \text{not } p$$

$$= \text{not} ( \text{not } q ) \text{ or } \text{not } p$$

$$= q \text{ or } \text{not } p$$

$$= \text{not } p \text{ or } q$$

$$= p \rightarrow q$$

26.

$$\text{not } p \rightarrow (q \rightarrow r)$$

$$= \text{not } p \rightarrow (\text{not } q \text{ or } r)$$

$$= \text{not} ( \text{not } p ) \text{ or } (\text{not } q \text{ or } r)$$

$$= p \text{ or } (\text{not } q \text{ or } r)$$

**= not q or ( p or r )**

**= q -> ( p or r )**

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**32.**

**Suppose : p is true**

**q is flase**

**r is flase**

**So , wo can get that : ( p and q ) -> r is flase**

**( p -> r ) and ( q -> r ) is true**

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Finish