Pick the Warm Up

do front side only

$a \vee b \Rightarrow c$

a	b	c	$a \vee b$	c	$(a \vee b) \Rightarrow c$
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	T	T	T
T	F	F	T	F	F
F	T	T	T	T	T
F	T	F	T	F	F
F	F	T	F	T	T
F	F	F	F	F	T

$a \Rightarrow b \wedge c$

a	b	c	a	$b \wedge c$	$a \Rightarrow b \wedge c$
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	T	F	F
T	F	F	T	F	F
F	T	T	F	T	T
F	T	F	F	F	T
F	F	T	F	F	T
F	F	F	F	F	T

Prove DeMorgan's 2nd Law

negating an "AND" statement

$\neg (p \wedge q) = \neg p \vee \neg q$

Back side

p	q	$p \wedge q$	$\neg p$	$\neg q$	$\neg (p \wedge q)$	$\neg p \vee \neg q$
T	T					
T	F					
F	T					
F	F					

p	q	¬p	¬q	p∧q	¬(p∧q)	¬p ∨ ¬q
T	T	F	F	T	F	F
T	F	F	T	F	T	T
F	T	T	F	F	T	T
F	F	T	T	F	T	T

before grabbing the solutions to the HW, check your answer to the truth table

$$p \lor (\neg p \land q)$$

p	q	$\neg p$	$\neg p \land q$	$p \lor (\neg p \land q)$
T	T	F	F	T
T	F	F	F	T
F	T	T	T	T
F	F	T	F	f

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pg 504   15C..... 3c

3 Use deMorgan's properties to find the negation of :

  c $x < -1$ or $x > 7$

$$\neg (p \land q) = \neg p \lor \neg q$$
$$\neg (p \lor q) = \neg p \land \neg q$$

negation

   $x \geq -1$ and $x \leq 7$

p509
EXERCISE 15F

1 Write the converse and inverse for:

  a If $5x - 2 = 13$, then $x = 3$.

(a) If $x = 3$ then $5x - 2 = 13$.

if $5x - 2 \neq 13$, then $x \neq 3$

d If a figure is a parallelogram, then its opposite sides are equal in length.

If a figure has opp sides equal in length, then the figure is a parallelogram.

If a figure is not a par, then then opp sides are not =

---

3 Write down the contrapositives of these statements:

  a All rose bushes have thorns.

same as:

If a plant is a rose bush, then it has thorns.

Contrapositive:

If a plant does not have thorns, then it is not a rose bush

c No good soccer player has poor kicking skills.

Same as:
If a soccer player is no good, then they have poor kicking skills.

contrapositive:
If a soccer player does not have poor kicking skills, then the player is not a bad player.

e If a person is fair and clever then the person is a doctor.

Contrapositive:
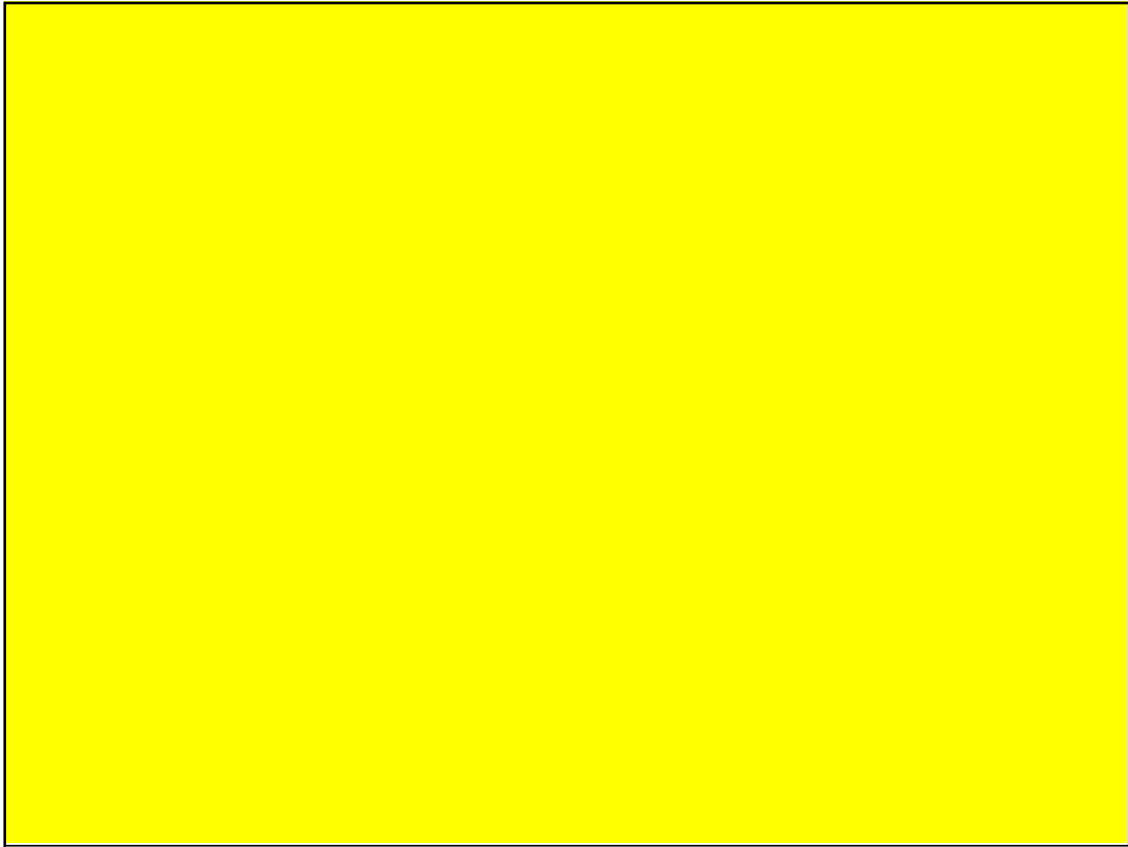If a person is not a doctor, then the person is not fair nor clever.

5 Write down the contrapositive of:

   b x is a number ending in 2 $\Rightarrow$ x is even

if x is odd, then x is not a number ending in 2.

I

II

III

IV

V

VI

VII

What would be the issues with setting up a truth table for the following compound proposition?

$$\neg p \lor (q \land r)$$

AIM: Three Proposition Truth Tables

your notes

will also be set up in a standard way

P	q	r		$\neg p \lor (q \land r)$

P	q	r		¬P ∨ (q ∧ r)
T	T	T		
T	T	F		
T	F	T		
T	F	F		
F	T	T		
F	T	F		
F	F	T		
F	F	F		

P	q	r	¬P	q ∧ r	¬P ∨ (q ∧ r)
T	T	T	f	T	T
T	T	F	f	f	f
T	F	T	f	f	f
T	F	F	f	f	f
F	T	T	T	T	T
F	T	F	T	f	T
F	F	T	T	f	T
F	F	F	T	f	T

Construct a truth
  table for

$$(p \vee q) \vee (p \wedge \neg r)$$

p	q	r		$(p \vee q) \vee (p \wedge \neg r)$

How many
additional
columns ?

p	q	r	¬r	(p∨q)	(p∧¬r)	(p∨q)∨(p∧¬r)
T	T	T	F	T	F	T
T	T	F	T	T	T	T
T	F	T	F	T	F	T
T	F	F	T	T	F	T
F	T	T	F	T	F	T
F	T	F	T	T	F	T
F	F	T	F	F	F	F
F	F	F	T	F	F	F

B B

Assignment:

Logic Assignment #4