Solution for (i), $p = a \wedge (\neg b \vee c)$

Solution (Instructor only):

(a) Clauses are a, b, c.

(b) $p_a = \neg b \vee c$
$p_b = a \wedge \neg c$
$p_c = a \wedge b$

(c) Note: Blank cells represent values of 'F'.

	a	b	c	p	p_a	p_b	p_c
1	T	T	T	T	T		T
2	T	T	F			T	T
3	T	F	T	T	T		
4	T	F	F	T	T	T	
5	F	T	T		T		
6	F	T	F				
7	F	F	T		T		
8	F	F	F		T		

(d) GACC pairs for clause a are: $\{1, 3, 4\} \times \{5, 7, 8\}$.
There is only one GACC pair for clause b: $(2, 4)$.
There is only one GACC pair for clause c: $(1, 2)$.

(e) CACC pairs for clauses a, b, and c are the same as GACC pairs.

(f) RACC pairs for clause a are: $(1, 5), (3, 7)(4, 8)$.
RACC pairs for clauses b and c are the same as CACC pairs.

(g) GICC tuples for a are: $(2, 6)$ *for* $p = F$ *; no feasible pair for* $p = T$.
GICC tuples for b are: $\{5, 6\} \times \{7, 8\}$ *for* $p = F$; $(1, 3)$ *for* $p = T$.
GICC tuples for c are: $\{5, 7\} \times \{6, 8\}$ *for* $p = F$; $(3, 4)$ *for* $p = T$.

(h) RICC tuples for a are same as GICC.
RICC tuples for b are: $(5, 7), (6, 8)$ *for* $p = F$; $(1, 3)$ *for* $p = T$.
RICC tuples for c are: $(5, 6), (7, 8)$ *for* $p = F$; $(3, 4)$ *for* $p = T$.

Solution for (ix), $p = a \vee b \vee (c \wedge d)$

Solution (Instructor only):

(a) *Clauses are* a, b, c, d.

(b) $p_a = \neg b \wedge (\neg c \vee \neg d)$
$p_b = \neg a \wedge (\neg c \vee \neg d)$
$p_c = \neg a \wedge \neg b \wedge d$
$p_d = \neg a \wedge \neg b \wedge c$

(c)

	a	b	c	d	p	p_a	p_b	p_c	p_d
1	T	T	T	T	T				
2	T	T	T	F	T				
3	T	T	F	T	T				
4	T	T	F	F	T				
5	T	F	T	T	T				
6	T	F	T	F	T	T			
7	T	F	F	T	T	T			
8	T	F	F	F	T	T			
9	F	T	T	T	T				
10	F	T	T	F	T		T		
11	F	T	F	T	T		T		
12	F	T	F	F	T		T		
13	F	F	T	T	T			T	T
14	F	F	T	F		T	T		T
15	F	F	F	T		T	T	T	
16	F	F	F	F		T	T		

(d) *GACC pairs for clause a are:* $\{6, 7, 8\} \times \{14, 15, 16\}$.
GACC pairs for clause b are: $\{10, 11, 12\} \times \{14, 15, 16\}$.
GACC pair for clause c is: $(13, 15)$.
GACC pair for clause d is: $(13, 14)$.

(e) *CACC pairs for clauses a, b, c, and d are the same as GACC pairs.*

(f) *RACC pairs for clause b are:* $(6, 14), (7, 15), (8, 16)$.
RACC pairs for clause b are: $(10, 14), (11, 15), (12, 16)$.
RACC pairs for clauses c and d are the same as CACC pairs.

(g) *GICC tuples for clause a are:*
no feasible pair for $p = F$; $\{1, 2, 3, 4, 5\} \times \{9, 10, 11, 12, 13\}$ *for* $p = T$.
GICC tuples for clause b are:
no feasible pair for $p = F$; $\{1, 2, 3, 4, 9\} \times \{5, 6, 7, 8, 13\}$ *for* $p = T$.
GICC tuples for clause c are:
(14,16) for $p = F$; $\{1, 2, 5, 6, 9, 10\} \times \{3, 4, 7, 8, 11, 12\}$ *for* $p = T$.
GICC tuples for clause d are:
(15,16) for $p = F$; $\{1, 3, 5, 7, 9, 11\} \times \{2, 4, 6, 8, 10, 12\}$ *for* $p = T$.

(h) *RICC tuples for clause a are:*
no feasible pair for $p = F$*;* $(1, 9), (2, 10), (3, 11), (4, 12), (5, 13)$ *for* $p = T$*.*
RICC tuples for clause b are:
no feasible pair for $p = F$*;* $(1, 5), (2, 6), (3, 7), (4, 8), (9, 13)$ *for* $p = T$*.*
RICC tuples for clause c are:
$(14, 16)$ *for* $p = F$*;* $(1, 3), (2, 4), (5, 7), (6, 8), (9, 11), (10, 12)$ *for* $p = T$*.*
RICC tuples for clause d are:
$(14, 16)$ *for* $p = F$*;* $(1, 2), (3, 4), (5, 6), (7, 8), (9, 10), (11, 12)$ *for* $p = T$*.*

Solution for (x), $p = (a \wedge b) \vee (b \wedge c) \vee (a \wedge c)$

Solution (Instructor only):

(a) Clauses are a, b, c.

(b) All three answers are equivalent and can be expressed in a couple of different ways:
$p_a = b \wedge \neg c \vee \neg b \wedge c$
$p_b = a \wedge \neg c \vee \neg a \wedge c$
$p_c = a \wedge \neg b \vee \neg a \wedge b$
or with an exclusive or:
$p_a = b \oplus c$
$p_b = a \oplus c$
$p_c = a \oplus b$

(c) Note: Blank cells represent values of 'F'.

	a	b	c	p	p_a	p_b	p_c
1	T	T	T	T			
2	T	T	F	T	T	T	
3	T	F	T	T	T		T
4	T	F	F			T	T
5	F	T	T	T		T	T
6	F	T	F		T		T
7	F	F	T		T	T	
8	F	F	F				

(d) GACC pairs for clause a are: $\{2, 3\} \times \{6, 7\}$.
GACC pairs for clause b are: $\{2, 5\} \times \{4, 7\}$.
GACC pairs for clause c are: $\{3, 5\} \times \{4, 6\}$.

(e) CACC pairs for clauses a, b, and c are the same as GACC pairs.

(f) RACC pairs for clause a are: $(2, 6), (3, 7)$.
RACC pairs for clause b are: $(2, 4), (5, 7)$.
RACC pairs for clause c are: $(3, 4), (5, 6)$.

(g) GICC tuples for clause a are: $(4, 8)$ $p = F$; $(1, 5)$ *for* $p = T$.
GICC tuples for clause b are: $(6, 8)$ $p = F$; $(1, 3)$ *for* $p = T$.
GICC tuples for clause c are: $(7, 8)$ $p = F$; $(1, 2)$ *for* $p = T$.

(h) RICC tuples for a, b, and c are same as GICC tuples.