Team #:____ Name:____________________

Absent:

1) Draw the logic circuit using ANDs, ORs, and NOT gates for F = $\overline{A}\overline{B}C + A\overline{B}\overline{C} + \overline{A}BC + A\overline{B}C$.
What is the complexity (sum of # inputs and # gates)?

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Absent:

Identity Name	AND Form	OR Form
Identity Law	$1x = x$	$0+x = x$
Null (or Dominance) Law	$0x = 0$	$1+x = 1$
Idempotent Law	$xx = x$	$x+x = x$
Inverse Law	$x\bar{x} = 0$	$x+\bar{x} = 1$
Commutative Law	$xy = yx$	$x+y = y+x$
Associative Law	$(xy)z = x(yz)$	$(x+y)+z = x+(y+z)$
Distributive Law	$x+yz = (x+y)(x+z)$	$x(y+z) = xy+xz$
Absorption Law	$x(x+y) = x$	$x+xy = x$
DeMorgan's Law	$(\overline{xy}) = \bar{x}+\bar{y}$	$(\overline{x+y}) = \bar{x}\bar{y}$
Double Complement Law	$\bar{\bar{x}} = x$	

2) Using Boolean Algebra simplify F= $\bar{A}\bar{B}C + A\bar{B}\bar{C} + \bar{A}BC + A\bar{B}C$.

3) Draw the simplified logic circuit using ANDs, ORs, and NOT.
What is the complexity (sum of # inputs and # gates)?

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Absent:

4) Simplify the following using K-maps:

a) $F_1 = \overline{A}\overline{B}\overline{C} + \overline{A}B + \overline{A}BC + A\overline{B}C + A\overline{B}\overline{C}$

b) $F_2 = \overline{A}\overline{B}\overline{D} + AC\overline{D} + AB\overline{C}\overline{D} + A\overline{B}\overline{C}\overline{D} + ABCD$

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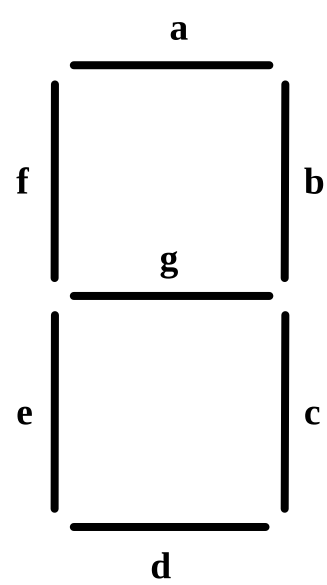
Absent:

5) For the BCD to seven-segment display, what would the simplified SOP expression for the "c" segment? (Use "d" for don't cares)

Decimal Value	x_1	x_2	x_3	x_4	**a**	**b**	**c**
0	0	0	0	0	1	1	
1	0	0	0	1	0	1	
2	0	0	1	0	1	1	
3	0	0	1	1	1	1	
4	0	1	0	0	0	1	
5	0	1	0	1	1	0	
6	0	1	1	0	1	0	
7	0	1	1	1	1	1	
8	1	0	0	0	1	1	
9	1	0	0	1	1	1	
10	1	0	1	0	d	d	
11	1	0	1	1	d	d	
12	1	1	0	0	d	d	
13	1	1	0	1	d	d	
14	1	1	1	0	d	d	
15	1	1	1	1	d	d	



6) Since there are so many 1's in function c above, consider implementing $\bar{c}$ and then negating it.