Homework 2 | 11 Sept 2023 | Gabe DiMartino

1a $xy + xy'$

$= x(y+y')$

$x(1)$

$\boxed{x}$

1b $(x+y)(x+y')$

$x + xy' + xy + yy'$

$x(1+y') + xy + 0$

$x + xy$

$x(1+y)$

$\boxed{=x}$

1c $xyz + x'y + xyz'$

$y(xz + x' + xz')$

$y(x(z+z') + x')$

$\boxed{=y}$

1d $(A+B)'(A'+B')$

$A'B'(A'+B')$

$A'A'B' + A'B'B'$

$\boxed{A'B'}$

1e $xyz' + x'yz + xyz + x'yz'$

$y(xz' + x'z + xz + x'z')$

$y(x'(z'+z) + x(z'+z))$

$\boxed{y}$

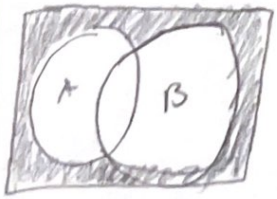
1f $ABC + A'B + ABC'$

$B(AC + A' + AC')$

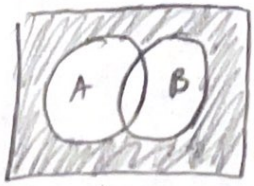
$B'(A(C+C') + A')$

$\boxed{B}$

2 $(a+b)' = A'B'$

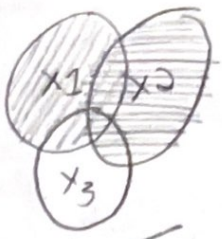


$(a+b)'$ ✓



$A'B'$ ✓

3 $(x_1 + x_2 + x_3)\cdot(x_1 + x_2 + \bar{x}_3) = x_1 + x_2$



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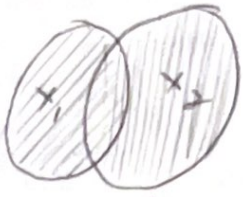

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$(x_1 + x_2 + x_3)\cdot(x_1 + x_2 + \bar{x}_3)$ $\quad (x_1 + x_2)$

4.) $x_1\bar{x}_2\bar{x}_3 + x_1x_2x_4 + x_1\bar{x}_2x_3\bar{x}_4$

$x_1\bar{x}_2\bar{x}_3(x_4 + \bar{x}_4) + x_1x_2x_4 + x_1\bar{x}_2x_3\bar{x}_4$

$x_1\bar{x}_2\bar{x}_3x_4 + x_1\bar{x}_2\bar{x}_3\bar{x}_4 + x_1x_2x_4 + x_1\bar{x}_2x_3\bar{x}_4$

$x_1\bar{x}_2\bar{x}_3 + x_1\bar{x}_2(x_3 + \bar{x}_3)\bar{x}_4 + x_1x_2x_4$

$\boxed{x_1\bar{x}_2\bar{x}_3 + x_1\bar{x}_2\bar{x}_4 + x_1x_2x_4}$

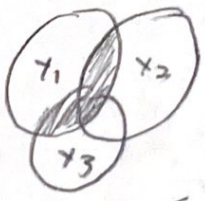
5.) $(x_1 + x_2 + x_4)(x_1 + \bar{x}_2 + x_3)(x_1 + \bar{x}_3 + \bar{x}_3 + x_4)$

$(x_1 + x_3 + x_4)(x_1 + \bar{x}_2 + x_3)(x_1 + \bar{x}_2 + x_3 + x_4)(x_1 + \bar{x}_3 + \bar{x}_3 + x_4)$

$(x_1 + x_3 + x_4)(x_1 + \bar{x}_2 + x_3)((x_1 + \bar{x}_2 + x_4)(x_3 + \bar{x}_3))$

$\boxed{(x_1 + x_3 + x_4)(x_1 + \bar{x}_2 + x_3)(x_1 + \bar{x}_2 + x_4)}$

6. $x_1x_2 + x_1x_3 = x_1(x_2 + x_3)$



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$x_1x_2 + x_1x_3$ $\quad x_1(x_2 + x_3)$