Discrete Math 11.4b

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Ex. 9-19 odd, 25(1,5,9)

9 $wxyz \vee wx\bar{y}z \vee wx\bar{y}\bar{z} \vee w\bar{x}yz \vee w\bar{x}y\bar{z} \vee w\bar{x}\bar{y}\bar{z} \vee \bar{w}xyz \vee \bar{w}xy\bar{z} \vee \bar{w}x\bar{y}z \vee \bar{w}x\bar{y}\bar{z} \vee \bar{w}\bar{x}yz \vee \bar{w}\bar{x}y\bar{z} \vee \bar{w}\bar{x}\bar{y}\bar{z}$

11 $x \vee xy = x(y \vee \bar{y}) \vee xy = x\bar{y} \vee xy$

(13) $f(x,y,z) = x \vee y(x \vee \bar{z})$

$= x \vee xy \vee y\bar{z}$

$= xyz \vee xy\bar{z} \vee x\bar{y}z \vee x\bar{y}\bar{z} \vee \bar{x}y\bar{z}$

(15) $f(x,y,z) = (\bar{x}y \vee \overline{xz})(\overline{x \vee yz})$

$= (\bar{x}y \vee \bar{x} \vee \bar{z})(\bar{x}(\bar{y} \vee \bar{z}))$ $= \bar{x}\bar{y} \vee \bar{x}\bar{z}$

$= (\bar{x} \vee \bar{z})(\bar{x}\bar{y} \vee \bar{x}\bar{z}) = \bar{x}\bar{y} \vee \bar{x}\bar{z} \vee \bar{x}\bar{y}\bar{z} \vee \bar{x}\bar{z}$

$= \bar{x}\bar{y}z \vee \bar{x}\bar{y}\bar{z} \vee \bar{x}y\bar{z}$

(17) $f(x,y,z) = (x \vee \bar{x}y \vee \bar{x}y\bar{z})(xy \vee \overline{xz})(y \vee xy\bar{z})$

$= (x \vee y)(xy \vee \bar{x} \vee \bar{z})y$ note $y(x+y) = xy+y = y$

$= y$

$= xyz \vee xy\bar{z} \vee \bar{x}yz \vee \bar{x}y\bar{z}$

(19) $f(w,x,y,z) = wy \vee (w\bar{y} \vee z)(x \vee \bar{w}z)$

$= wy \vee wx\bar{y} \vee xz \vee \bar{w}\bar{y}\bar{z} \vee \bar{w}z$

$= wy \vee wx\bar{y} \vee xz \vee \bar{w}z$

$= wxyz \vee wxy\bar{z} \vee w\bar{x}yz \vee w\bar{x}y\bar{z} \vee wx\bar{y}z \vee wx\bar{y}\bar{z} \vee \bar{w}xyz \vee \bar{w}x\bar{y}z \vee \bar{w}\bar{x}yz \vee \bar{w}\bar{x}y\bar{z}$

(25) ① $xy \vee \bar{x}y \vee \bar{x}\bar{y}$

⑤ $xyz \vee xy\bar{z} \vee x\bar{y}z \vee \bar{x}yz \vee \bar{x}\bar{y}z \vee \bar{x}y\bar{z}$

⑨ $wxyz \vee wx\bar{y}z \vee w\bar{x}\bar{y}\bar{z} \vee \bar{w}xyz \vee \bar{w}\bar{x}yz$