

9.5

HW02

2.30; 3.4; 3.5; 3.16; 3.19; 3.20

Jesse Dai  
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2.30 B:  $X(a,b,c) = (\bar{a} + \bar{b}) \cdot c$

F: expression using only NAND gates

$$= \bar{a} \cdot c + \bar{b} \cdot c = \bar{a} \cdot c + \bar{b} \cdot c = (\bar{a} \cdot c) \cdot (\bar{b} \cdot c)$$

$$X(a,b,c) = (\bar{a} \cdot c) \cdot (\bar{b} \cdot c)$$

X -1/2

3.4 B: take

F: SOP form of function  $g(A,B,C)$ 

S:

A	B	C	g
0	0	0	0
0	0	1	0
0	1	0	1 ←
0	1	1	1 ←
1	0	0	1 ←
1	0	1	0
1	1	0	1 ←
1	1	1	1 ←

$$g(A,B,C) = \bar{A} \cdot B \cdot \bar{C} + \bar{A} \cdot B \cdot C + A \cdot \bar{B} \cdot \bar{C} + A \cdot B \cdot \bar{C} + A \cdot B \cdot C$$

✓ 3.5 G: table  
F: POS form  
S:

$$f(A, B, C) = (A+B+C)(A+B+\bar{C})(\bar{A}+B+\bar{C})$$

✓ 3.16 G:  $f(x, y, z) = m_0 + m_2 + m_4 + m_5$

F: a) in terms of  $x, y, z$

b) simplify to simplest

S:

	x	y	z	f
$m_0$	0	0	0	1
$m_1$	0	0	1	0
$m_2$	0	1	0	1
$m_3$	0	1	1	0
$m_4$	1	0	0	1
$m_5$	1	0	1	1
$m_6$	1	1	0	0
$m_7$	1	1	1	0

a)  $f(x, y, z) = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + x\bar{y}z$

	yz		
x	00	01	11
0	1	0	0
1	0	1	1

$$\begin{aligned} \bar{x}\bar{z}(y+\bar{y}) &= \bar{x}\bar{z} \\ x\bar{y}(z+\bar{z}) &= x\bar{y} \end{aligned}$$

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

3. P.G:  $G(a,b) = M_0 \cdot M_2$   
 F:  $G$  as funct of  $a+b$   
 S:

	$a$	$b$	$G$
$M_0$	0	0	0
$M_1$	0	1	1
$M_2$	1	0	0
$M_3$	1	1	1

$$G(a,b) = (a+b)(\bar{a}+b)$$

✓ 3.20B:  $G(A, B, C) = \text{TTM}(1, 3, 4, 7)$   
 B:  $G(A, B, C)$  in terms of  $A, B, C$

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	A	B	C	G
m <sub>0</sub>	0	0	0	1
m <sub>1</sub>	0	0	1	0
m <sub>2</sub>	0	1	0	1
m <sub>3</sub>	0	1	1	0
m <sub>4</sub>	1	0	0	0
m <sub>5</sub>	1	0	1	1
m <sub>6</sub>	1	1	0	1
m <sub>7</sub>	1	1	1	0

$$G(A, B, C) = (A + B + \bar{C})(A + \bar{B} + \bar{C})(\bar{A} + B + C)(\bar{A} + \bar{B} + \bar{C})$$