1. F(1,1,1)?
2. F(0,1,0)?
3. F(1,0,1)?

TABLE 2

x	y	z	xy	$\overline{z}$	$F(x, y, z) = xy + \overline{z}$
1	1	1	1	0	1
1	1	0	1	1	1
1	0	1	0	0	0
1	0	0	0	1	1
0	1	1	0	0	0
0	1	0	0	1	1
0	0	1	0	0	0
0	0	0	0	1	1

4. What Boolean operation is F_8?
5. What Boolean operation is F_9?

TABLE 3 **The Boolean Functions of Degree Two.**

x	y	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8	F_9	F_{10}	F_{11}	F_{12}	F_{13}	F_{14}	F_{15}	F_{16}
1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
1	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
0	1	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

6. Prove using tables:

$$x + yz = (x+y)(x+z)$$

TABLE 5 Boolean Identities.

Identity	*Name*
$\overline{\overline{x}} = x$	Law of the double complement
$x + x = x$ $x \cdot x = x$	Idempotent laws
$x + 0 = x$ $x \cdot 1 = x$	Identity laws
$x + 1 = 1$ $x \cdot 0 = 0$	Domination laws
$x + y = y + x$ $xy = yx$	Commutative laws
$x + (y + z) = (x + y) + z$ $x(yz) = (xy)x$	Associative laws
$x + yz = (x + y)(x + z)$ $x(y + z) = xy + xz$	Distributive laws
$\overline{(xy)} = \overline{x} + \overline{y}$ $\overline{(x + y)} = \overline{x}\,\overline{y}$	De Morgan's laws
$x + xy = x$ $x(x + y) = x$	Absorption laws
$x + \overline{x} = 1$	Unit property
$x\overline{x} = 0$	Zero property

7. What are the minterms of F(x,y)?

8. What is F(x,y) as sum-of-products?

9. What is F(x,y,z) as sum-of-products?

x	y	F(x,y)
0	0	1
0	1	1
1	0	0
1	1	0

x	y	z	F(x,y,z)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

10. Give the table for:

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

11. Find the sum-of-products expansion:

$$F(x,y,z) = xy$$

1. F(1,1,1)? 1
2. F(0,1,0)? 1
3. F(1,0,1)? 0

TABLE 2

x	y	z	xy	$\overline{z}$	$F(x, y, z) = xy + \overline{z}$
1	1	1	1	0	1
1	1	0	1	1	1
1	0	1	0	0	0
1	0	0	0	1	1
0	1	1	0	0	0
0	1	0	0	1	1
0	0	1	0	0	0
0	0	0	0	1	1

4. What Boolean operation is F_8? AND
5. What Boolean operation is F_9? Not AND or NAND

TABLE 3 The Boolean Functions of Degree Two.

x	y	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8	F_9	F_{10}	F_{11}	F_{12}	F_{13}	F_{14}	F_{15}	F_{16}
1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
1	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
0	1	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

6. Prove using tables:

$$x + yz = (x+y)(x+z)$$

x	y	z	yz	x+yz	x+y	x+z	(x+y)(x+z)
0	0	0	0	**0**	0	0	**0**
0	0	1	0	**0**	0	1	**0**
0	1	0	0	**0**	1	0	**0**
0	1	1	1	**1**	1	1	**1**
1	0	0	0	**1**	1	1	**1**
1	0	1	0	**1**	1	1	**1**
1	1	0	0	**1**	1	1	**1**
1	1	1	1	**1**	1	1	**1**

7. What are the minterms of F(x,y)?

$\bar{x}\bar{y}$ $\bar{x}y$

8. What is F(x,y) as sum-of-products?

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

9. What is F(x,y,z) as sum-of-products?

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

x	y	F(x,y)
0	0	1
0	1	1
1	0	0
1	1	0

x	y	z	F(x,y,z)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

10. Give the table for:

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

x	y	z	F(x,y,z)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

11. Find the sum-of-products expansion: F(x,y,z) = xy

x	y	z	x+y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

$$F(x,y,z) = xy = xy\bar{z} + xyz$$