1.

$$F(A,B,C,D) = \overline{A}\overline{B}\overline{C} + \overline{A}BD + \overline{A}\overline{C}D + \overline{B}\overline{C}D$$
$$+ \overline{A}BC\overline{D} + \overline{A}BC\overline{D} + AB\overline{C}\overline{D} + ABCD$$

2.

$$F(A,B,C,D) = \overline{B}\overline{C} + \overline{B}D + AB$$

3.

$$F(A,B,C,D) = A + \overline{B}\overline{C} + \overline{B}\overline{D}$$

4.

$$F(X,Y,Z) = \sum m(0,4,5,7)$$

5.
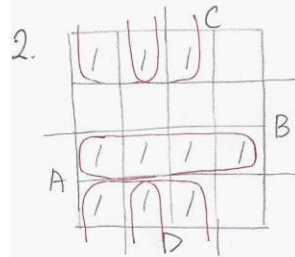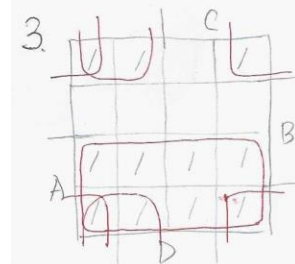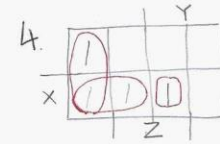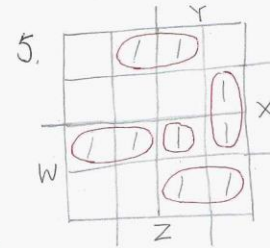
$$F(W,X,Y,Z) = \sum m(1,3,6,10,11,12,13,14,15)$$

6.
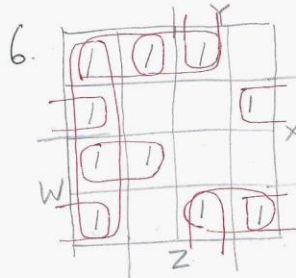
$$F(W,X,Y,Z)$$
$$= \overline{W}\overline{X}\overline{Y} + \overline{W}\overline{X}\overline{Z} + \overline{W}X\overline{Z} + WX\overline{Y} + W\overline{X}\overline{Z}$$
$$+ W\overline{X}Y + \overline{Y}\overline{Z} + \overline{X}YZ$$
$$= \overline{W}\overline{X}Z + \overline{Y}\overline{Z} + \overline{W}X\overline{Z} + WX\overline{Y} + W\overline{X}Y$$

7.
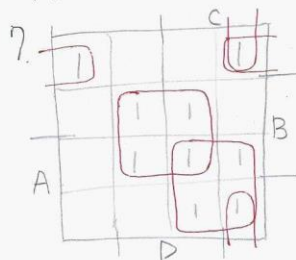
$$F(A,B,C,D) = BD + AC + \overline{B}C\overline{D} + \overline{A}\overline{B}\overline{D}$$
$$= BD + AC + \overline{A}\overline{B}\overline{D}$$

8.
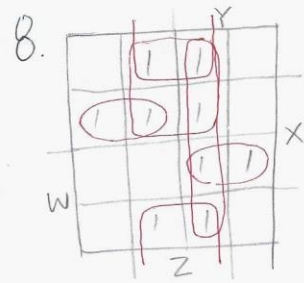
$$F(W,X,Y,Z) = \overline{W}Z + \overline{X}Z + YZ$$
$$+ \overline{W}X\overline{Y} + WXY$$
$$= WXY + \overline{W}X\overline{Y} + \overline{X}Z + YZ$$

9.

$$F(A,B,C) = AB + AC + BC$$

10.
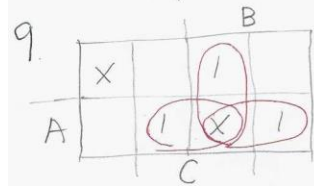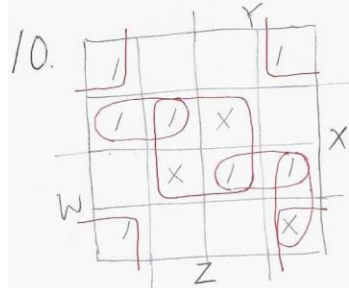
$$F(W,X,Y,Z) = \overline{X}\,\overline{Z} + XZ + \overline{W}X\overline{Y}$$
$$+ WXY + WY\overline{Z}$$
$$= \overline{X}\,\overline{Z} + XZ + \overline{W}X\overline{Y} + WXY$$

11.
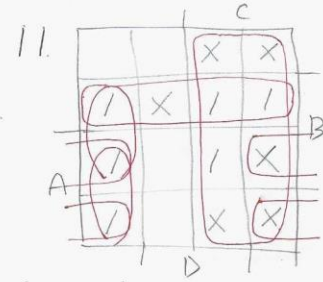
$$F(A,B,C,D)$$
$$= C + \overline{A}B + B\overline{C}\,\overline{D} + A\overline{C}\,\overline{D} + AB\overline{D} + A\overline{B}\,\overline{D}$$
$$= C + \overline{A}B + A\overline{C}\,\overline{D}$$