- Write the *sum-of-minterms* **and** *product-of-maxterms* expressions **for both** the *true* and the *complement* form of the following Boolean expressions:

    - $\bar{X}\bar{Z} + Y\bar{Z} + XYZ$
    - $\bar{A}\bar{B} + A\bar{C}D + \bar{B}C + \bar{A}B\bar{C}\bar{D}$

- Write the *sum-of-minterms* **and** *product-of-maxterms* expressions **for both** the *true* and the *complement* form of the following Boolean expressions:

  - $\bar{X}\bar{Z} + Y\bar{Z} + XYZ$

X	Y	Z	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

$$F(X,Y,Z) = \sum(0,2,6,7) = \prod(1,3,4,5)$$
$$\bar{F}(X,Y,Z) = \sum(1,3,4,5) = \prod(0,2,6,7)$$

or through algebraic manipulation:

$$\begin{aligned} F(X,Y,Z) &= \bar{X}\bar{Z} + Y\bar{Z} + XYZ \\ &= \bar{X}(\bar{Y} + Y)\bar{Z} + (\bar{X} + X)Y\bar{Z} + XYZ \\ &= \bar{X}\bar{Y}\bar{Z} + \bar{X}Y\bar{Z} + \bar{X}Y\bar{Z} + XY\bar{Z} + XYZ \\ &= m_0 + m_2 + m_6 + m_7 = \sum(0,2,6,7) = \prod(1,3,4,5) \end{aligned}$$

  - $\bar{A}\bar{B} + A\bar{C}D + \bar{B}C + \bar{A}B\bar{C}\bar{D}$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

$$F(A,B,C,D) = \sum(0,1,2,3,4,9,10,11,13) = \prod(5,6,7,8,12,14,15)$$
$$\bar{F}(A,B,C,D) = \sum(5,6,7,8,12,14,15) = \prod(0,1,2,3,4,9,10,11,13)$$

Again, the above can be found through algebraic manipulation.