

4.

$$(a) F(x, y, z) = \Sigma(0, 1, 2, 4)$$

$$D(x, y, z) = \Sigma(3, 6, 7)$$

| $x \backslash yz$ | 00 | 01 | 11 | 10 |
|-------------------|----|----|----|----|
| 0 | 1 | 1 | X | 1 |
| 1 | 1 | | X | X |

Red circle around the top row (00, 01, 11, 10) is labeled x' .
Red circle around the first column (00, 1) is labeled z' .

$$F = x' + z' \quad (\text{sum of products})$$

(b)

$$F(A, B, C, D) = \Sigma(1, 3, 5, 7, 9, 15)$$

$$D(A, B, C, D) = \Sigma(4, 10, 11, 12)$$

| $AB \backslash CD$ | 00 | 01 | 11 | 10 |
|--------------------|----|----|----|----|
| 00 | | 1 | 1 | |
| 01 | X | 1 | 1 | |
| 11 | X | | 1 | |
| 10 | | 1 | X | X |

Red circle around the top two rows (00, 01) is labeled $A'D$.
Red circle around the middle two rows (01, 11) is labeled CD .
Red circle around the bottom two rows (10, 11) is labeled $B'D$.

$$F = CD + B'D + A'D \quad (\text{sum of products})$$