

4. $f_1(A, B)$ is true only when both A and B are true.
(TT)

$$A=T, B=T \Rightarrow A \cdot B = T$$

$$A=T, B=F \Rightarrow A \cdot B = F$$

$$A=F, B=T \Rightarrow A \cdot B = F$$

$$A=F, B=F \Rightarrow A \cdot B = F$$

So, $f_1(A, B) = A \cdot B$

$f_2(A, B)$ is true only when A is T and B is F

$$A=T, B=\bar{T} \Rightarrow A \cdot \bar{B} = F$$

$$A=T, B=F \Rightarrow A \cdot \bar{B} = T$$

$$A=\bar{T}, B=T \Rightarrow A \cdot \bar{B} = F$$

$$A=F, B=F \Rightarrow A \cdot \bar{B} = F$$

So, $f_2(A, B) = A \cdot \bar{B}$

$f_3(A, B)$ is true only when both A is F and B is T.

$$A=\bar{T}, B=T \Rightarrow \bar{A} \cdot B = F$$

$$A=\bar{T}, B=F \Rightarrow \bar{A} \cdot B = F$$

$$A=F, B=T \Rightarrow \bar{A} \cdot B = T$$

$$A=F, B=F \Rightarrow \bar{A} \cdot B = F$$

So, $f_3(A, B) = \bar{A} \cdot B$

$f_4(A, B) = \overline{A \cdot B}$ is true only when A and B both are false.

$$A=T, B=T \Rightarrow \overline{A \cdot B} = F$$

$$A=\bar{T}, B=F \Rightarrow \overline{A \cdot B} = F$$

$$A=F, B=T \Rightarrow \overline{A \cdot B} = F$$

$$A=F, B=F \Rightarrow \overline{A \cdot B} = T$$

So, $f_4(A, B) = \overline{A \cdot B}$