

T11.

$$X \cdot Y + X' \cdot Z + \underbrace{Y \cdot Z}_{\text{red}} = X \cdot Y + X' \cdot Z$$

$$\begin{aligned} & X \cdot Y + X' \cdot Z + Y \cdot Z \cdot (X + X') \quad \downarrow X + X' = 1 \\ &= X \cdot Y(1 + Z) + X' \cdot Z(1 + X) \quad \downarrow 1 + X = 1 \\ &= X \cdot Y + X' \cdot Z \end{aligned}$$

T11'

$$\begin{aligned} & (X + Y) \cdot (X' + Z) \cdot (Y + Z) = (X + Y) \cdot (X' + Z) \\ &= (X + Y) \cdot (X' + Z) \cdot (Y + Z + X \cdot X') \\ &= (X + Y) \cdot (X' + Z) \cdot (Y + Z + X) \cdot (Y + Z + X') \quad \downarrow \begin{aligned} & (X + Y)(X + Y + Z) = (X + Y) \\ & (X' + Z)(X' + Z + Y) = (X' + Z) \end{aligned} \quad (X \cdot (X + Y) = X) \\ &= (X + Y) \cdot (X' + Z) \end{aligned}$$

$$\begin{aligned} a + c \cdot d &= (a + c) \cdot (c + d) \\ &= a \cdot (c + d) + c \cdot d \\ &= a \cdot a + a \cdot d + c \cdot d \\ &= a + d(a + c) \\ &= a \cdot (a + c) + d(a + c) \\ &= (a + d) \cdot (a + c) \end{aligned}$$

$$a \cdot b + c \cdot d = \underbrace{(a + c) \cdot (a + d)}_{\text{red}} \cdot \underbrace{(b + c) \cdot (b + d)}_{\text{red}}$$

$$\begin{array}{l|l} a \cdot a + a \cdot c + a \cdot d + c \cdot d & b \cdot b + b \cdot c + b \cdot d + c \cdot d \\ = a + a \cdot (c + d) + c \cdot d & = b + b \cdot (c + d) + c \cdot d \\ = a + c \cdot d & = b + c \cdot d \end{array}$$

$$\begin{aligned} & \Rightarrow (a + c \cdot d) \cdot (b + c \cdot d) \\ &= a \cdot b + a \cdot b \cdot c + b \cdot c \cdot d + c \cdot d \cdot c \cdot d = a \cdot b(1 + c) + b \cdot c \cdot d + c \cdot d \\ &= a \cdot b + c \cdot d(b + 1) = a \cdot b + c \cdot d \end{aligned}$$