

$$\begin{aligned}
 \text{c) } X\bar{Y} + XZ + \bar{Z}Y &= X\bar{Y} + XZ + \bar{Z}Y + \underline{XY} \\
 &= X(\bar{Y} + Y) + XZ + \bar{Z}Y \\
 &= X + XZ + \bar{Z}Y \\
 &= X + \bar{Z}Y
 \end{aligned}$$

Consensus

$$\begin{aligned}
 4. (\bar{a} + \bar{b})(\bar{b} + \bar{c})(\bar{c} + \bar{a}) &= (\bar{a}\bar{b} + \bar{a}\bar{c} + \bar{b}\bar{b} + \bar{b}\bar{c})(\bar{a} + \bar{c}) \\
 &= (\bar{a}\bar{b} + \bar{b} + \bar{b}\bar{c} + \bar{a}\bar{c})(\bar{a} + \bar{c}) \\
 &= (\bar{b} + \bar{a}\bar{c})(\bar{a} + \bar{c}) \\
 &= \bar{a}\bar{b} + \bar{b}\bar{c} + \bar{a}\bar{c} \\
 &= \text{LHS}
 \end{aligned}$$

$$\begin{aligned}
 5. F = \overline{a + (d+a)cg} &= \overline{a + (\bar{a}\bar{d}c\bar{g})} \\
 &= \bar{a} \cdot (a + d + \bar{c} + \bar{g}) \\
 &= \bar{a}d + \bar{a}\bar{c} + \bar{a}\bar{g}
 \end{aligned}$$

$$6. Z = ab + c(a+b) = f(a, b, c)$$

$$\begin{aligned}
 \bar{Z} &= \overline{\{ab\} + \{c(a+b)\}} \\
 &= \{\bar{a} + \bar{b}\} \{\bar{c} + (\bar{a}\bar{b})\} \\
 &= \bar{a}\bar{c} + \bar{b}\bar{c} + \bar{a}\bar{b} + \bar{a}\bar{b} \\
 &= \bar{a}\bar{b} + \bar{c}(\bar{a} + \bar{b}) = f(\bar{a}, \bar{b}, \bar{c})
 \end{aligned}$$

$$\begin{aligned}
 Z &= f(a, b, c) \\
 &= \overline{f(\bar{a}, \bar{b}, \bar{c})} \\
 \therefore &\text{ it is self-dual}
 \end{aligned}$$