

$$\begin{aligned}
 1. a) X\bar{Y} + \overline{X\bar{Y}} + \overline{X}Y &= \overbrace{(X + \overline{X})}^1 \cdot \bar{Y} + \overline{X} \cdot Y \\
 &= \bar{Y} + \overline{X} \cdot Y \\
 &= (\bar{Y} + \bar{Y}) \cdot (\overline{X} + Y) \\
 &= \overline{X} + Y
 \end{aligned}$$

$$\begin{aligned}
 2.) \overline{\overline{X}Y\bar{Z}} \cdot \overline{X\bar{Y}\bar{Z}} \cdot X\bar{Y}Z &= (X + \bar{Y} + \bar{Z}) \cdot (\overline{X} + Y + Z) \cdot (X\bar{Y}Z) \\
 &= (0 + X\bar{Y} + XZ + \bar{Y}\bar{X} + \bar{Y} + \bar{Y}Z + \bar{X}\bar{Z} + \bar{Y}\bar{Z} + 0)X\bar{Y}Z \\
 &= (\bar{Y}(\cancel{X} + \bar{X}) + \bar{Y}(\cancel{1} + \bar{Z}) + XZ + \bar{X}\bar{Z} + \bar{Y}\bar{Z})X\bar{Y}Z \\
 &= (\bar{Y}(\cancel{1} + \bar{Z}) + XZ + \bar{X}\bar{Z})X\bar{Y}Z \\
 &= X\bar{Y}Z + 0 + X\bar{Y}Z \\
 &= X\bar{Y}Z
 \end{aligned}$$