1. a) $X\bar{Y} + \bar{X}\bar{Y} + \bar{X}Y = (X + \bar{X}) \cdot \bar{Y} + \bar{X} \cdot Y$

$= \bar{Y} + \bar{X} \cdot Y$

$= (Y + \bar{Y}) \cdot (\bar{X} + \bar{Y})$

$= \bar{X} + \bar{Y}$

b) $\overline{\bar{X}Y\bar{Z}} \cdot \overline{XY\bar{Z}} \cdot X\bar{Y}Z = (X + \bar{Y} + \bar{Z}) \cdot (\bar{X} + \bar{Y} + Z) \cdot (X\bar{Y}Z)$

$= (0 + X\bar{Y} + XZ + \bar{Y}\bar{X} + \bar{Y} + \bar{Y}Z + \bar{X}\bar{Z} + \bar{Y}\bar{Z} + 0)X\bar{Y}Z$

$= (\bar{Y}(X + \bar{X}) + \bar{Y}(Y + Z) + XZ + \bar{X}\bar{Z} + \bar{Y}\bar{Z})X\bar{Y}Z$

$= (\bar{Y}(1 + Z) + XZ + \bar{X}\bar{Z})X\bar{Y}Z$

$= X\bar{Y}Z + 0 + X\bar{Y}Z$

$= X\bar{Y}Z$