EG3029 Chemical Thermodynamics

Tutorial 7

Problem 1:
The following expressions have been proposed for the partial molar properties of a particular binary mixture:

$$\overline{M}_1 = M_1 + Ax_2 \qquad \overline{M}_2 = M_2 + Ax_1$$

Here, parameter A is a constant. Can these expressions possibly be correct? Explain.

Problem 2:
The volume change of mixing ($cm^3\ mol^{-1}$) for the system ethanol (1)/methyl butyl ether (2) at 25°C is given by the equation:

$$\Delta V = x_1 x_2 \cdot \left[-1.026 + 0.220 \cdot (x_1 - x_2)\right]$$

Given that V_1 = 58.63 $cm^3\ mol^{-1}$ and V_2 = 118.46 $cm^3\ mol^{-1}$, what volume of mixture is formed when 750 cm^3 of pure species 1 is mixed with 1,500 cm^3 of species 2 at 25°C? What would be the volume if an ideal solution were formed? (2243 cm^3; 2250 cm^3)