$$\mathbf{a}_{x_i}^{\top}\mathbf{p} = \begin{bmatrix} \boxed{-X_i, -Y_i, -Z_i, -1}, & \boxed{0, 0, 0, 0}, & \boxed{x_i X_i, x_i Y_i, x_i Z_i, x_i} \end{bmatrix} \begin{bmatrix} \boxed{\begin{matrix} p_{11} \\ p_{12} \\ p_{13} \\ p_{14} \end{matrix}} \\ \mathbf{A} \\ \boxed{\begin{matrix} p_{21} \\ p_{22} \\ p_{23} \\ p_{24} \end{matrix}} \\ \mathbf{B} \\ \boxed{\begin{matrix} p_{31} \\ p_{32} \\ p_{33} \\ p_{34} \end{matrix}} \\ \mathbf{C} \end{bmatrix}$$

$$= \begin{bmatrix} -\mathbf{X}_i^{\top}, & \mathbf{0}, & x_i \mathbf{X}_i^{\top} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{B} \\ \mathbf{C} \end{bmatrix}$$

$$= -\mathbf{X}_i^{\top}\mathbf{A} + x_i \mathbf{X}_i^{\top}\mathbf{C}$$