18. Find tangent planes to the surface $z = Ax^2 + By^2$.

$$G(x,y) = \left(x, y, Ax^2 + By^2\right)$$
$$G'(x,y) = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 2Ax & 2By \end{bmatrix}$$
$$G'(x,y)^{\perp} = s\begin{bmatrix} 2Ax \\ 2By \\ -1 \end{bmatrix}$$

So by plugging in x and y to $G'(x,y)^{\perp}$, the tangent planes at $\mathbf{p}_1 = (0,0,0), \mathbf{p}_2 = \left(a, 0, Aa^2\right)$, $\mathbf{p}_3 = \left(0, b, Bb^2\right)$ are:

$$P_1: \quad \begin{bmatrix} 0 & 0 & -1 \end{bmatrix}\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} 0 \end{bmatrix}$$
$$P_2: \quad \begin{bmatrix} 2Aa & 0 & -1 \end{bmatrix}\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix} - \begin{bmatrix} a \\ 0 \\ Aa^2 \end{bmatrix}\right) = \begin{bmatrix} 0 \end{bmatrix}$$
$$P_3: \quad \begin{bmatrix} 0 & 2Bb & -1 \end{bmatrix}\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix} - \begin{bmatrix} 0 \\ b \\ Bb^2 \end{bmatrix}\right) = \begin{bmatrix} 0 \end{bmatrix}$$