Lab 1

Identify and sketch the following surfaces:

- $36x^2 + 9y^2 + 4z^2 = 1$
- $\frac{x^2}{4} + \frac{y^2}{9} - \frac{z^2}{16} = 1$
- $x - y^2 - 4z^2 = 0$
- $2y^2 - x^2 + 2z^2 = 8$
- $-9x^2 + 4y^2 - 9z^2 = 36$
- $x^2 + z^2 - 2x + y - 2z + 4 = 0$
- $x^2 - 3y^2 - 3z^2 - 6y = 3$
- $4x^2 - y^2 + 4z^2 = -16$
- $y^2 - z^2 + x - 4y - 2z + 3 = 0$
- $8x^2 + 4y^2 + 9z^2 + 16x - 16y - 18z = 0$
- $z = 1 - \sqrt{x^2 + y^2}$

For each of the following, sketch the curve and find equations for the projections in the $xy-$ coordinate plane:

- $z = x^2 - 2y^2$, $z = 2x + 4y$
- $y^2 = z + x^2$, $y + 2z = 5$
- $z = x^2 + y^2$, $z = 4(x-1)^2 + 4(y-1)^2$