Graphing Functions of 2 Variables in $\mathbb{R}^3$- HW Problems

1. Let $f(x,y) = 9 - x^2 - y^2$.

a. Sketch the level curves for $f(x,y)$ for $c = 0, 4, 9$.

b. Sketch the sections of the graph of $f(x,y)$ given by
$x = 2, \quad x = 0, \quad x = -2, \qquad y = 2, \quad y = 0, \quad y = -2.$

Describe the surface in $\mathbb{R}^3$ given by the following equations.

2. $z = x^2 + y^2$
3. $z^2 = x^2 + y^2$
4. $z = x^2 - y^2$
5. $\frac{x^2}{16} + \frac{z^2}{9} = 1 + \frac{y^2}{4}$
6. $\frac{x^2}{16} + \frac{z^2}{9} = 1 - \frac{y^2}{4}$
7. $y = x^2$
8. $y^2 + z^2 = 1.$