1) Given the following Quadric Surface: $9x^2 - 4y^2 + 36z^2 - 18x + 32y - 216z + 269 = 0$

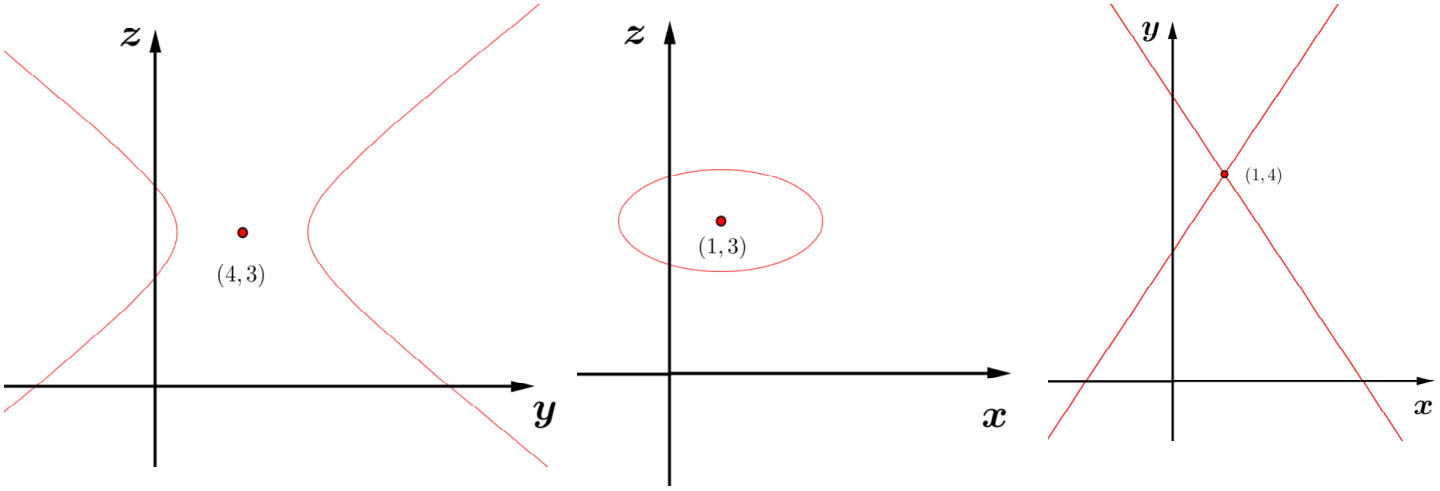
a) Reduce the equation to one of the standard forms.

$$\boxed{\frac{(x-1)^2}{4} - \frac{(y-4)^2}{9} + (z-3)^2 = 0}$$

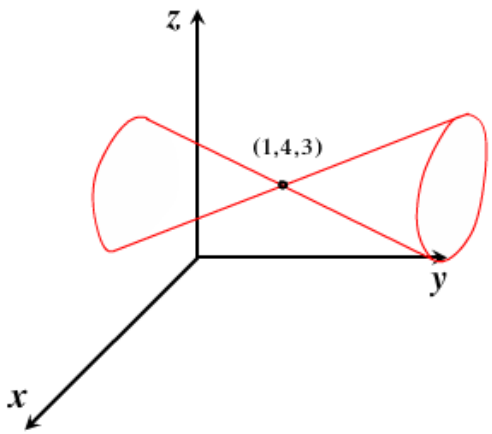
b) Sketch the trace when $x = 3$.

c) Sketch the trace when $y = 7$.

d) Sketch the trace when $z = 3$.



e) Use the traces to sketch the quadric surface.



f) Classify the surface. Elliptic Cone

2) Identify the quadric surface:

a) $x^2+\frac{y^2}{2}+z^2=1$ b) $16x^2-y^2+16z^2=4$ c) $4x^2-y^2-z^2=1$

d) $x^2-y+z^2=0$ e) $x^2-y^2+z=0$ f) $z^2=x^2+\frac{y^2}{9}$

a) Ellipsoid
b) Hyperboloid of one sheet
c) Hyperboloid of two sheets
d) Elliptic Paraboloid
e) Hyperbolic Paraboloid
f) Elliptic Cone

3) Find an equation for the surface of revolution generated by revolving the curve $z^2=4y$ in the yz-plane about the y-axis.

$$x^2+z^2=4y$$

4) Find an equation for the surface of revolution generated by revolving the curve $2z=\sqrt{4-x^2}$ in the xz-plane about the x-axis.

$$x^2+4y^2+4z^2=4$$

5) Find an equation for the surface of revolution generated by revolving the curve $z=\ln y$ in the yz-plane about the z-axis.

$$x^2+y^2=e^{2z}$$

6) Find an equation of a generating curve given the equation of its surface of revolution:

a) $x^2 + y^2 - 2z = 0$

b) $x^2 + z^2 = \cos^2 y$

a) $\boxed{y = \sqrt{2z} \quad \text{or} \quad x = \sqrt{2z}}$

b) $\boxed{x = \cos y \quad \text{or} \quad z = \cos y}$

7) Find an equation of the surface satisfying the following condition and identify the surface: the set of all points equidistant from the point $(0, 2, 0)$ and the plane $y = -2$.

$$\boxed{x^2 + z^2 = 8y, \text{ Elliptic Paraboloid}}$$

8) An ellipsoid is created by rotating the ellipse $4x^2 + y^2 = 16$ about the x-axis. Find an equation of the ellipsoid.

$$\boxed{\frac{x^2}{4} + \frac{y^2}{16} + \frac{z^2}{16} = 1}$$