Section 13.6 - Cylinders and Quadric Surfaces

- Cylinders: a surface that consists of all lines that are parallel to a given line and pass through a given plane curve.

Example: Sketch the graph of the surface $z = y^2$.

Example: Identify and sketch the surface of $x^2 + z^2 = 1$

- Quadric Surface: the graph of a second-degree equation in three variables, x, y, and z.
- The most general such equation is:

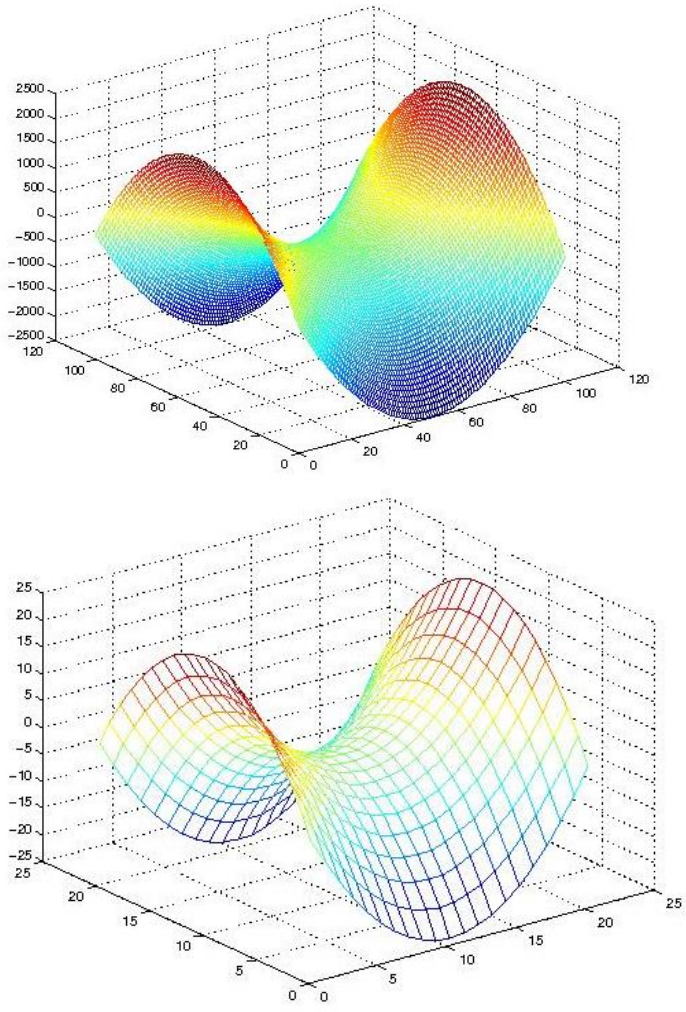
$$Ax^2 + By^2 + Cz^2 + Dxy + Eyz + Fxz + Gx + Hy + Iz + J = 0$$

Example: Sketch and identify the surface $25x^2 + 4y^2 + z^2 = 100$

Example: Sketch the surface $z = 3x^2 + y^2$

Example: Sketch the surface $z = x^2 - y^2$

Solution:



This surface is a **hyperbolic paraboloid** since the traces are hyperbolas and parabolas.