1-6 Videos Guide

1-6a

- Cylinder: A surface that consists of parallel lines through a plane curve

Exercises:

- Describe and sketch the surface $y = z^2$.
- Sketch a graph of the surface $z = \sin x$.

1-6b

- Equations of quadratic surfaces:
  - Ellipsoid: $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$
  - Cone: $\frac{z^2}{c^2} = \frac{x^2}{a^2} + \frac{y^2}{b^2}$
  - Elliptic paraboloid: $\frac{z}{c} = \frac{x^2}{a^2} + \frac{y^2}{b^2}$
  - Hyperboloid of one sheet: $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$
  - Hyperbolic paraboloid: $\frac{z}{c} = \frac{x^2}{a^2} - \frac{y^2}{b^2}$
  - Hyperboloid of two sheets: $-\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

Exercises:

- Use traces to sketch and identify the surface $4x^2 + 9y^2 + 9z^2 = 36$.

1-6c

- Sketch the region bounded by $x^2 + z^2 = 1$, $y + z = 2$, and $y = 0$.