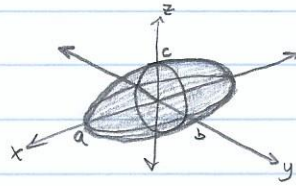


## Quadric Surfaces:

$$Ax^2 + By^2 + Cz^2 + Dxy + Exz + Fyz + Gx + Hy + Iz = J$$

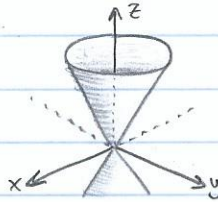
### Ellipsoid:

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

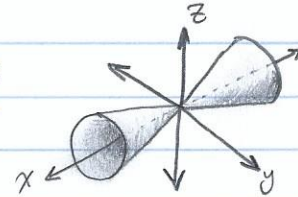


### Cone:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{z^2}{c^2}$$



$$\frac{z^2}{c^2} + \frac{y^2}{b^2} = \frac{x^2}{a^2}$$

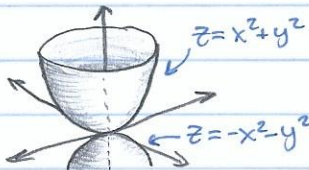


### Elliptic Paraboloid:

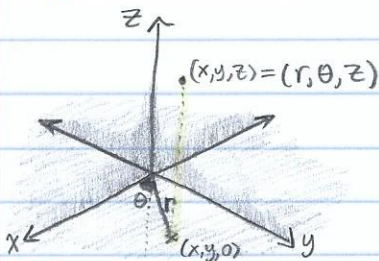
$$\frac{z}{c} = \frac{x^2}{a^2} + \frac{y^2}{c^2}$$

$\pm K$

Shifts it up or down



## Cylindrical Coordinates:



→ Conversion formulas:

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$x^2 + y^2 = r^2$$

stays the same  
 $z = z$

Ex:

•  $\frac{r^2 + z^2}{x^2 + y^2} = 4 \rightarrow$  Sphere of radius 2.

•  $r = 4 \rightarrow$  cylinder of radius 4 centered around z-axis.

•  $z = r \rightarrow$  cone