

FRI DAY

- NO synchronous
- attending a conf

Be dlewo

Quadric surfaces

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

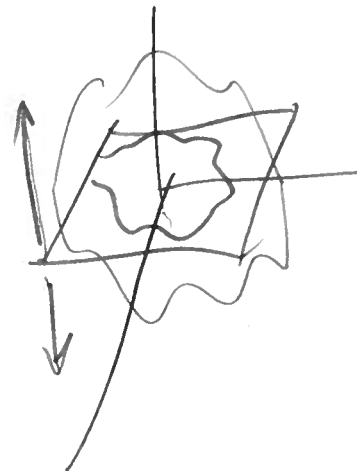
(2)

ellipse: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

hyperbola: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$

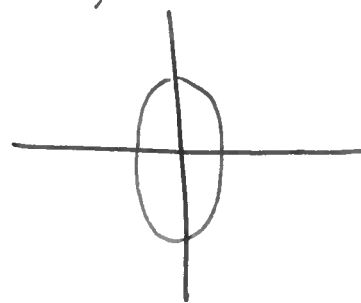
Ex: Sketch (use traces)

$$x^2 + \frac{y^2}{2} + \frac{z^2}{3} = 1$$



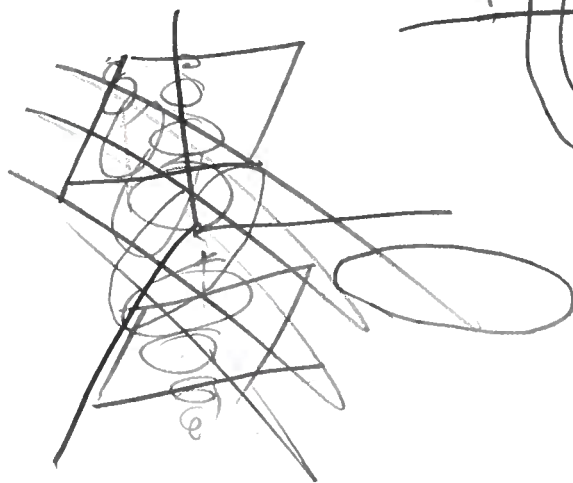
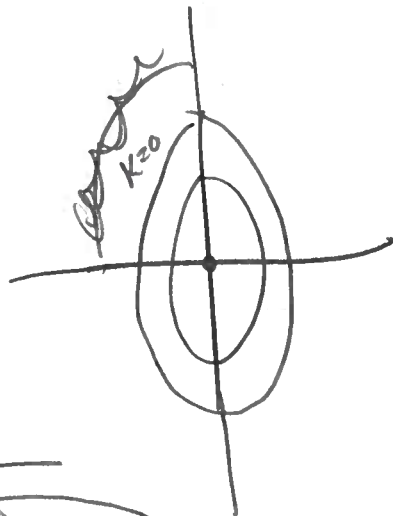
z=0 (xy-plane)

$$x^2 + \frac{y^2}{2} = 1 \sim \text{ellipse}$$

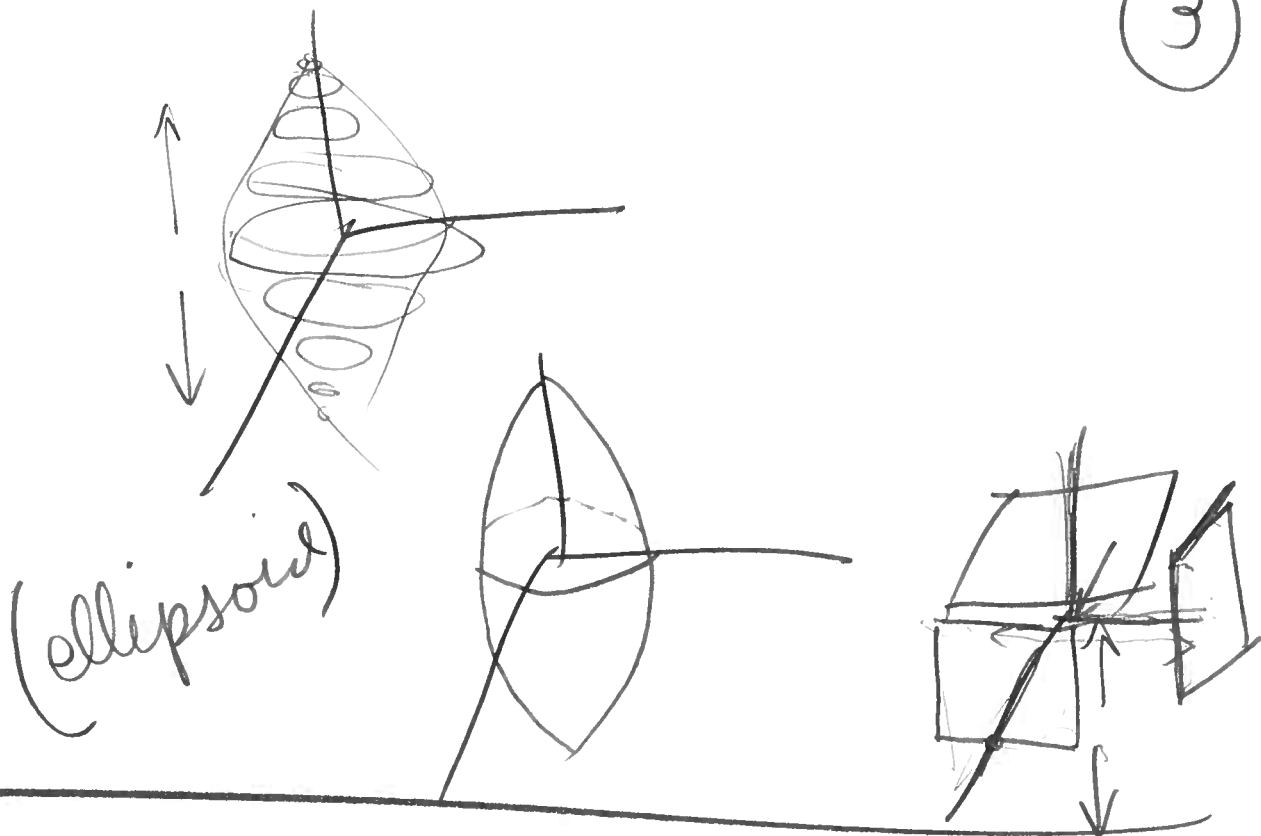


z=k

$$x^2 + \frac{y^2}{2} = 1 - \frac{k^2}{3}$$

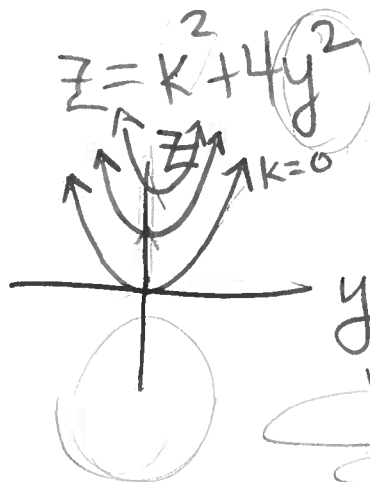


3

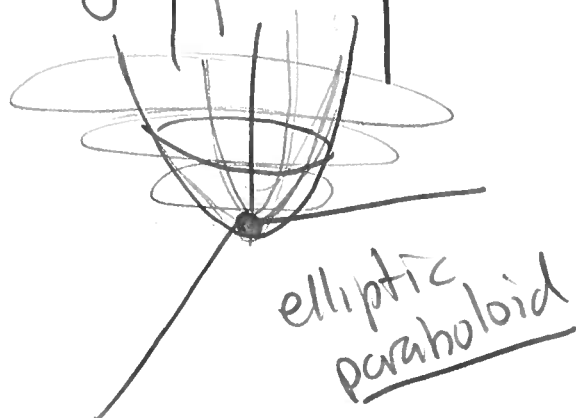
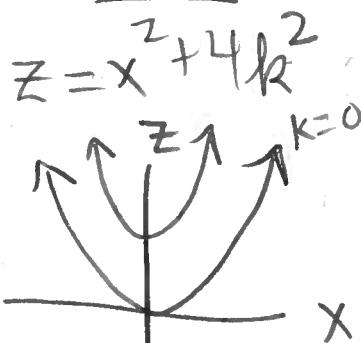


EX: $z = x^2 + 4y^2 \leftarrow 3D$

2D $\rightarrow x = k$



2D $\rightarrow y = k$



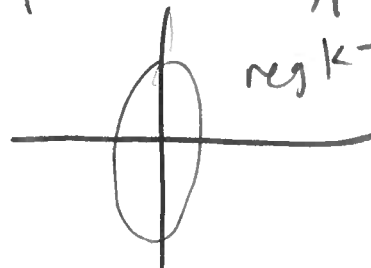
2D $\rightarrow z = k$

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

$1 = \frac{x^2}{k} + \frac{4y^2}{k}$

$\frac{y^2}{k/4}$

reg k \rightarrow nothing



$0 = x^2 + 4y^2$

$x = y = 0$

Ex: $Z = y^2 - x^2$

TRACES

$Z = k$

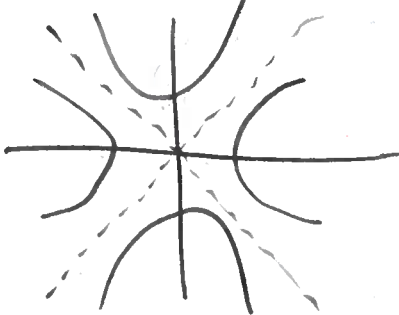
$k = y^2 - x^2$

hyperbolas
for all $k > 0$
 $k < 0$

$k = 0$

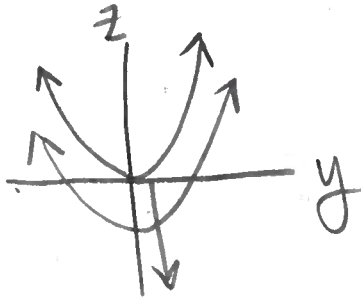
$0 = y^2 - x^2$

$x = \pm y$



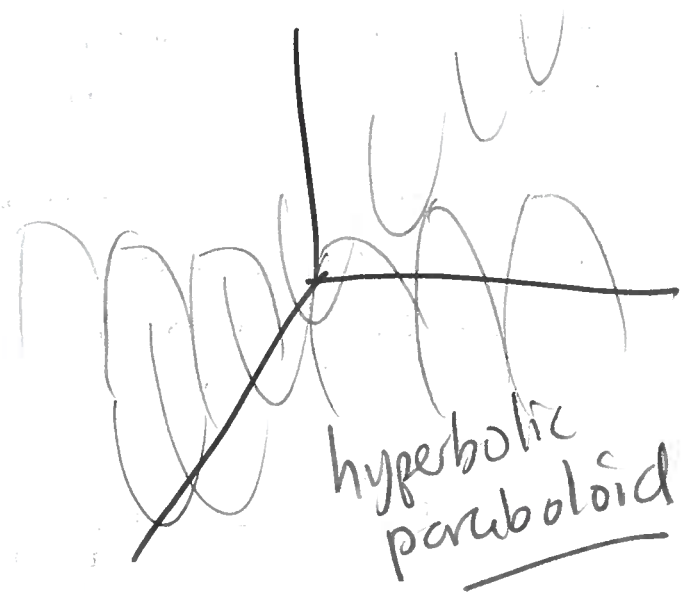
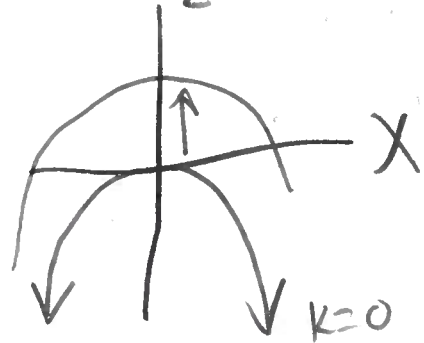
$x = k$

$Z = y^2 - k^2$



$y = k$

$Z = k^2 - x^2$



hyperbolic
paraboloid