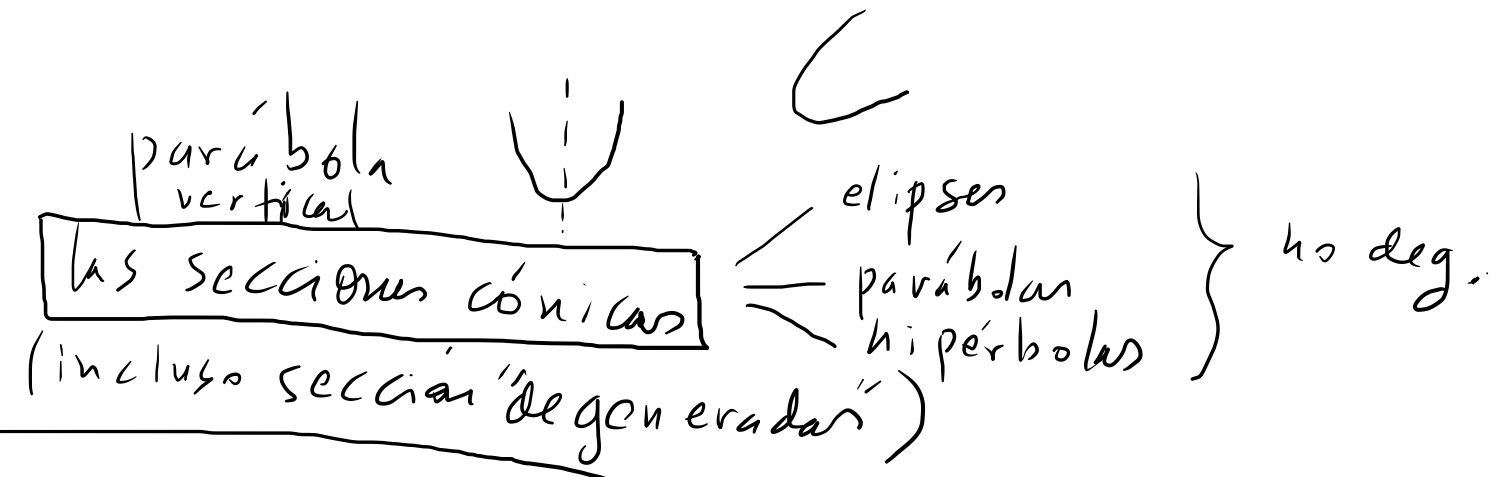


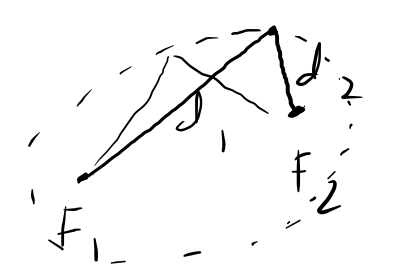
$Ax + By = C$
 $y = m_x + b$
 ecns lin.
 $y = ax^2 + bx + c$ \rightarrow prepa
 $Ax^2 + Bxy + Cy^2 + Dx + Ey = F$
 curvas cuad.

Aly.
 Geom.
 rectas

ej: $2x^2 + 3xy + 5z^2 + 6x + 10y = 37$
 ¿qué es eso?



Elipse: el lugar geométrico de los puntos en \mathbb{R}^2 cuya de
 (def.) distancia a 2 puntos fijos es constante.
 "focos"



$2d > \|F_1 - F_2\|$

P: de cuántos parámetros depende una elipse?
 R: 5.

del jardinero

Prop: una elipse es una curva cuad.

Dem: 1^{ero} para unas elipses muy especiales, con $F_1 = (c, 0)$, $F_2 = (-c, 0)$, $c > 0$

$d \Rightarrow (x, y)$ en la elipse con focos F_1, F_2 y suma de distancias $d_1 + d_2 = 2d$ si y solo si

$$2d = d_1 + d_2 = \|(x, y) - (c, 0)\| + \|(x, y) - (-c, 0)\| =$$

$$= \|(x-c, y)\| + \|(x+c, y)\| =$$

$$2d = \sqrt{(x-c)^2 + y^2} + \sqrt{(x+c)^2 + y^2} \quad / ()^2$$

$$4d^2 = (x-c)^2 + y^2 + (x+c)^2 + y^2 + 2\sqrt{(x-c)^2 + y^2} \sqrt{(x+c)^2 + y^2}$$

$$4d^2 = x^2 + c^2 - 2cx + y^2 + x^2 + c^2 + 2cx + y^2 + 2\sqrt{\dots}$$

$$4d^2 = 2x^2 + 2c^2 + 2y^2 + 2\sqrt{\dots} \quad / \div 2$$

$$2d^2 = x^2 + y^2 + c^2 + \sqrt{\dots}$$

$$(2d^2 - x^2 - y^2 - c^2)^2 = ((x-c)^2 + y^2)((x+c)^2 + y^2)$$

$$= (x^2 + c^2 + y^2 - 2cx)(x^2 + c^2 + y^2 + 2cx)$$

$$[2d^2 - (x^2 + y^2 + c^2)]^2 = (x^2 + y^2 + c^2)^2 - 4x^2$$

$$(2d^2)^2 + (x^2 + y^2 + c^2)^2 - 4d^2(x^2 + y^2 + c^2) =$$

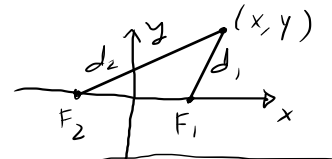
$$4(d^2 - c^2)x^2 + 4d^2 y^2 = 4d^2(d^2 - c^2) \quad / \div 4d^2(d^2 - c^2)$$

$$\frac{(d^2 - c^2)x^2}{d^2(d^2 - c^2)} + \frac{4d^2 y^2}{4d^2(d^2 - c^2)} = 1$$

$$\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = 1$$

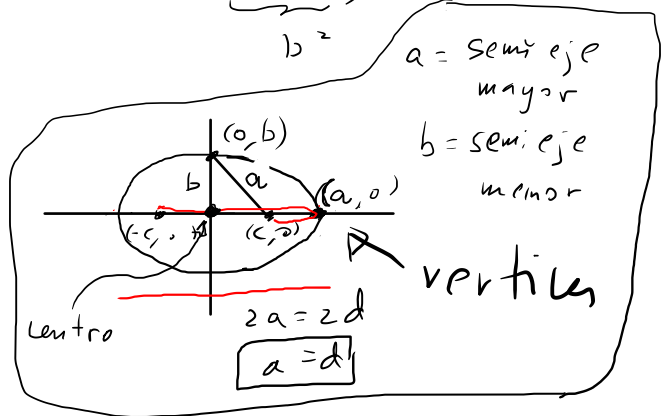
$$c^2 = a^2 - b^2$$

ecu de elipse en forma canónica (centro en el origen, eje mayor c eje x)

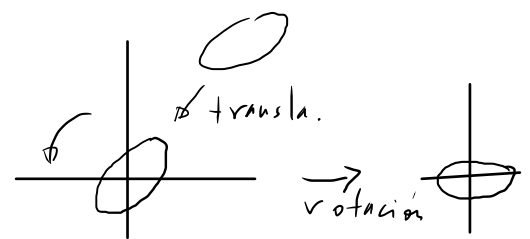


$$(A+B)(A-B) = A^2 - B^2$$

$$(A-B)^2 = A^2 - 2AB + B^2$$



Elipse general (idea) (más tarde los detalles)



Ejemplo: ¿cuál la distancia entre los focos de la elipse
¿cuanto miden su eje mayor/menor?

$$\left(\frac{x}{\frac{1}{\sqrt{2}}}\right)^2 + y^2 = 1$$

$$a = \frac{1}{\sqrt{2}}, \quad b = 1$$

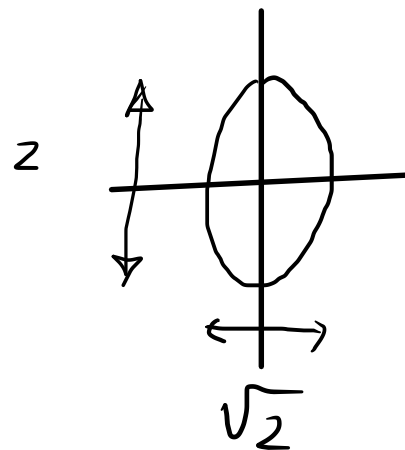
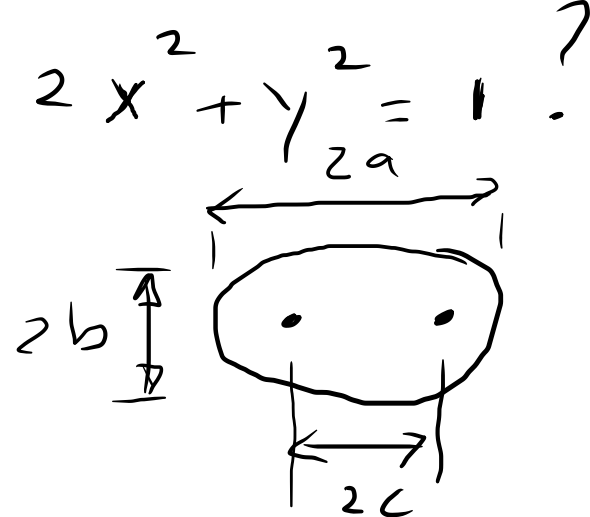
S.E. menor

S.E. mayor

$$2x^2$$

$$c^2 = 1^2 - \left(\frac{1}{\sqrt{2}}\right)^2 = 1 - \frac{1}{2} = \frac{1}{2}$$

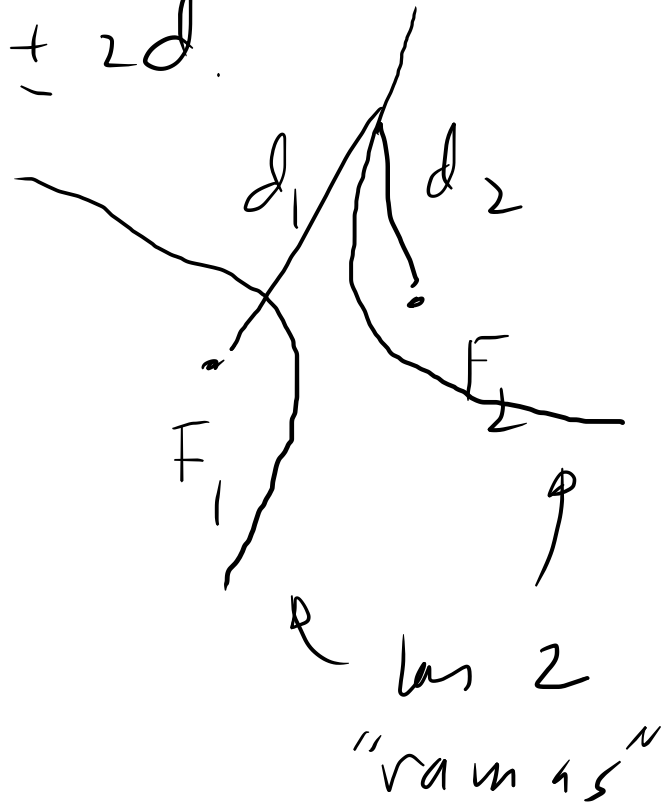
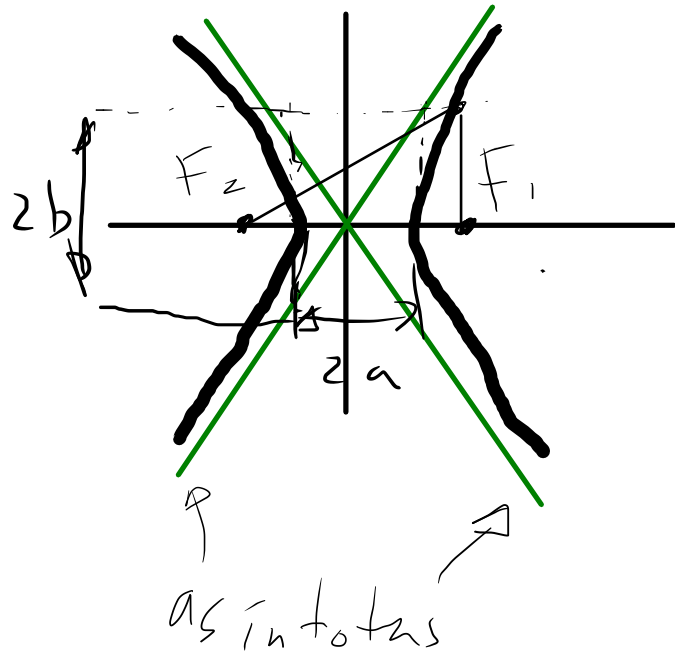
$$c = \frac{1}{\sqrt{2}} \Rightarrow 2c = \frac{2}{\sqrt{2}} = \sqrt{2}$$



Hiperbolas: lugar geom. de puntos cuyas diferencias de dist. a 2 puntos es fija. $|d_1 - d_2| = 2d$

$$\Leftrightarrow \left(\frac{x}{a}\right)^2 - \left(\frac{y}{b}\right)^2 = 1$$

$$d_1 - d_2 = \pm 2d$$



- directrices
- las propiedades ópticas
- construcción con conos

⋮