10.5: Conic Sections

Friday, April 04, 2014
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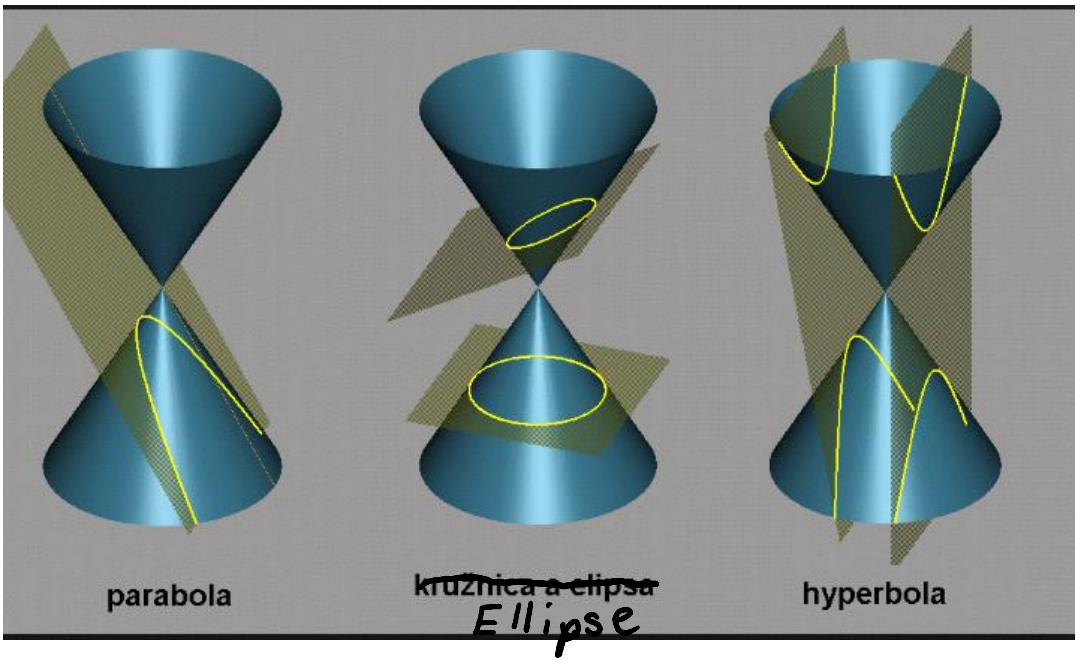

conic sections - Google Search
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Parabola

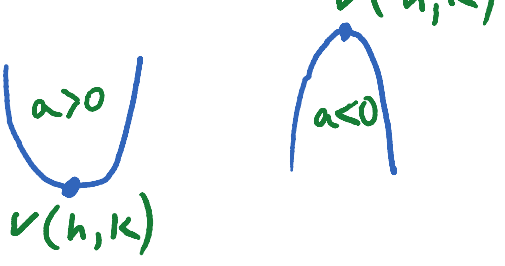
Standard Equations

$$(x-h)^2 = 4p(y-k)$$

$$a(x-h)^2 = y-k$$

vertex (h,k)

opens vertically



V (h, k)

opens horizontally $a(y-k)^2 = x-h$

V ⟨ a>0 a<0 ⟩ V

Ellipse

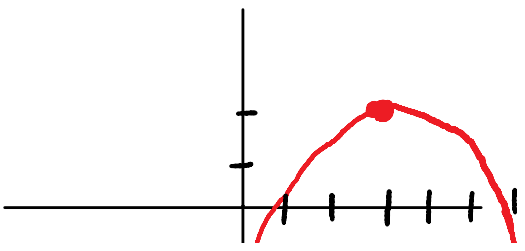
$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$ } major axis horizontal

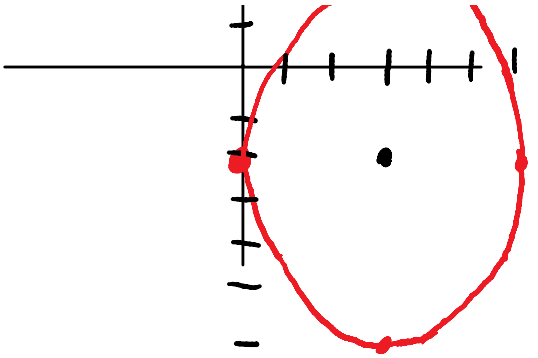
$$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$$ } major axis vertical

center (h, k)

(ex) $\frac{(x-3)^2}{9} + \frac{(y+2)^2}{16} = 1$

$C(3, -2)$





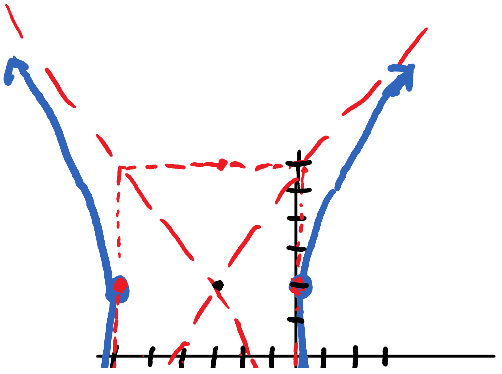
Hyperbolas

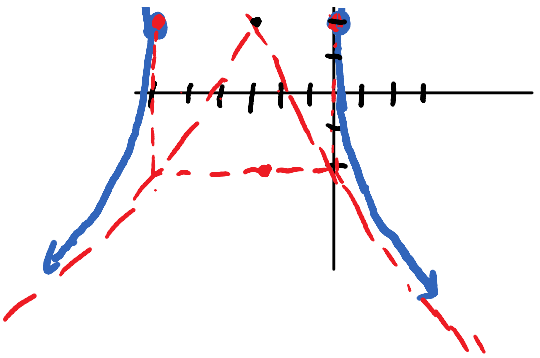
$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$ } opens horizontally

$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$ } opens vertically

ex $\frac{(x+3)^2}{9} - \frac{(y-2)^2}{16} = 1$

$C(-3, 2)$





(ex) Find parametric eqns.

$$\frac{(x-3)^2}{9} + \frac{(y+2)^2}{16} = 1$$

$$\cos^2\theta + \sin^2\theta = 1$$

$$\left(\frac{x-3}{3}\right)^2 + \left(\frac{y+2}{4}\right)^2 = 1$$

$$\frac{x-3}{3} = \cos t \quad , \quad \frac{y+2}{4} = \sin t$$

$$x = 3 + 3\cos t \quad , \quad y = -2 + 4\sin t, \quad 0 \le t \le 2\pi$$