E $+4x^2 + 9y^2 - 2x + 3y = 41$

C $8x - 4 = 5 - x^2 - y^2$

$1x^2 + 1y^2$

H $6y - (x-4)^2 + 3y^2 = 9$

P $x^2 = 8y$

November 21, 2024

Conic Sections Review

Circles $\frac{4x^2}{4}+\frac{4y^2}{4}-\frac{16x}{4}+\frac{40y}{4}-\frac{44}{4}=0$

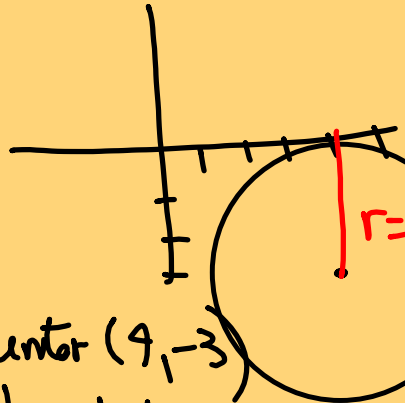
$(x^2-4x+4)+(y^2+10y+25)=11+4+25$

-2 $+5$

$(x-2)^2+(y+5)^2=40$

Center: $(2,-5)$ $\sqrt{r^2}=\sqrt{40}$ $4\cdot10$

$r=2\sqrt{10}$



Center $(4,-3)$

tangent to x-axis.

Write the eq.

$(x-4)^2+(y+3)^2=9$

November 21, 2024

$x = \frac{1}{20}(y+3)^2 - 1$

Vertex: $(-1, -3)$

Line of symm: $y = -3$

Direction: $+\frac{1}{20}$ right

Focus: $\left(h + \frac{1}{4a}, k\right)$

$\left(-1 + \frac{1}{4 \cdot \frac{1}{20}}, -3\right)$

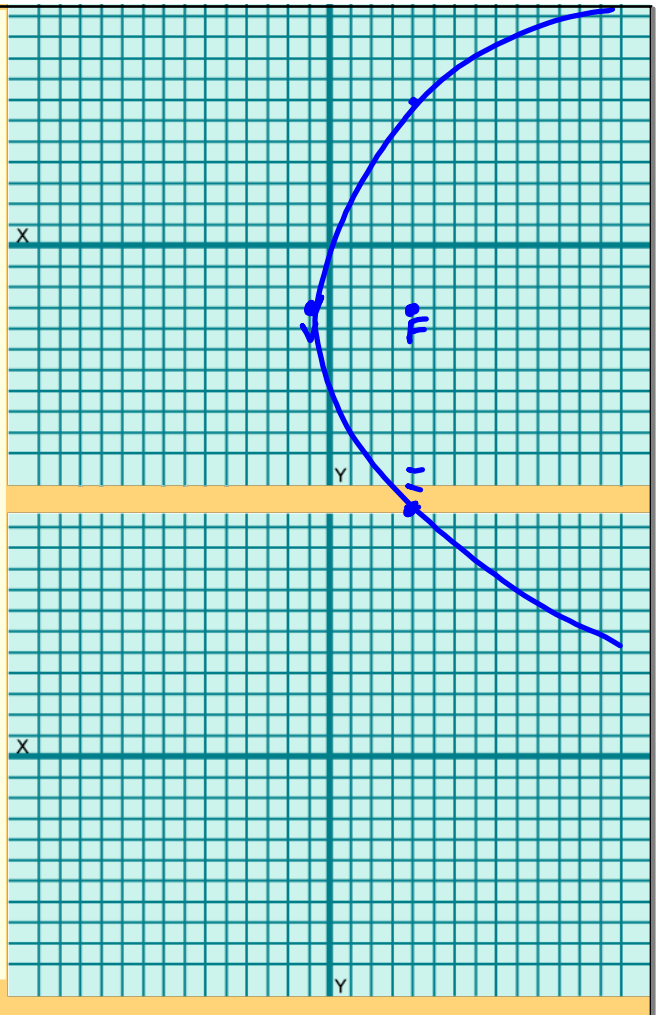
$\left(-1 + \frac{1}{\frac{1}{5}}, -3\right)$

$(-1 + 5, -3)$

Focus $(4, -3)$

Latus rectum $\left|\frac{1}{a}\right| = \left|\frac{1}{\frac{1}{20}}\right|$

$= 20$



Ellipses

$\frac{(x+4)^2}{4} + \frac{(y-5)^2}{9} = 1$

a is larger #

$a = \sqrt{9} = 3$

$b = \sqrt{4} = 2$

Vertical (Big # under y)

Hyperbolas

$\frac{(x+4)^2}{4} - \frac{(y-5)^2}{9} = 1$

$a = \sqrt{4} = 2$ a is the 1st #

$b = \sqrt{9} = 3$

x's are 1st (+) Horiz.

Compl. Square

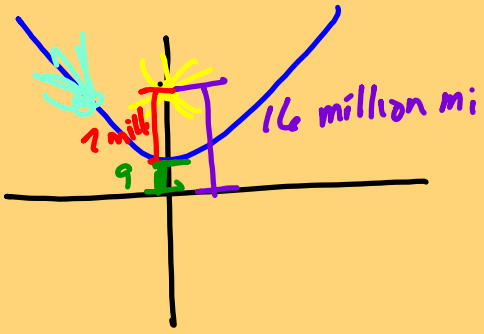
$25x^2 + 150x + 9y^2 - 18y + 9 = 0$

$25(x^2 + 6x + 9) + 9(y^2 - 2y + 1) = -9 + 225 + 9$

(+3, 225) (−1)

$\frac{25(x+3)^2}{225} + \frac{9(y-1)^2}{225} = \frac{225}{225}$

$\frac{(x+3)^2}{9} + \frac{(y-1)^2}{25} = 1$



Find eq. of hyperbola

$$\frac{(x-\#)^2}{\#^2} - \frac{(y-\#)^2}{\#^2} = 1$$

$a = 9$

$b =$

$c = 16$

$c^2 = a^2 + b^2$

$16^2 = 9^2 + b^2$

$16^2 - 9^2 = b^2$

$175 = b^2$

$$\frac{y^2}{9^2} - \frac{x^2}{\#^2} = 1$$

$$\frac{y^2}{81} - \frac{x^2}{175} = 1$$