

CONIC SECTIONS REVIEW

Circles

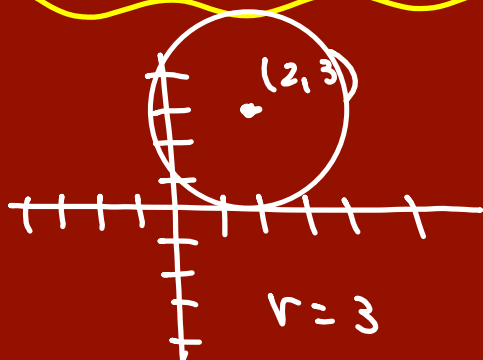
$$\frac{2x^2}{2} + \frac{2y^2}{2} + \frac{12x}{2} - \frac{8y}{2} - \frac{54}{2} = 0$$

$$x^2 + 6x + 9 + y^2 - 4y + 4 = 27 + 9 + 4$$

$$(x+3)^2 + (y-2)^2 = 40$$

Center: $(-3, 2)$

$$\sqrt{r^2} = \sqrt{40} = 2\sqrt{10}$$



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

$$x = -\frac{1}{16}(y-4)^2 + 2$$

Vertex: $(2, 4)$

Direction: left

Line of symm: $y = 4$

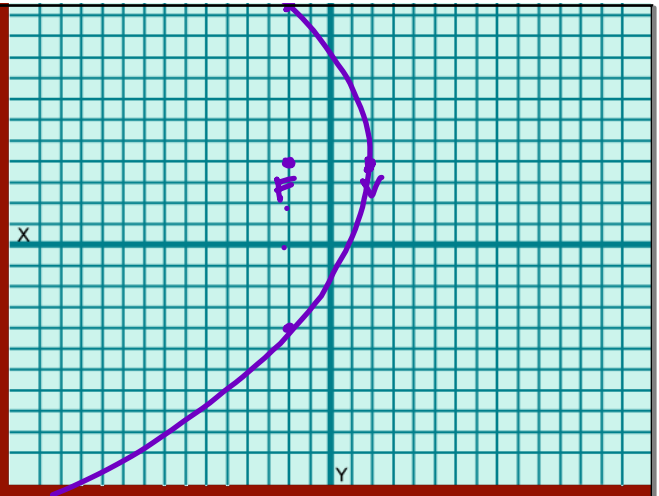
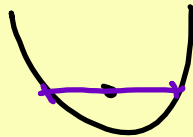
Focus: $(h + \frac{1}{4a}, k)$

$$(2 + \frac{1}{4(-\frac{1}{16}), 4)$$

$$(2 - 4, 4)$$

$$(-2, 4)$$

Latus: $= 16$



- 1) Plot vertex
- 2) Plot focus
- 3) Count $\frac{1}{2}$ of latus on each side of focus

$$9x^2 + 4y^2 + 36x - 40y + 100 = 0$$

$$9x^2 + 36x + 4y^2 - 40y = -100$$

$$9(x^2 + 4x + 4) + 4(y^2 - 10y + 25) = -100 + 36 + 100$$

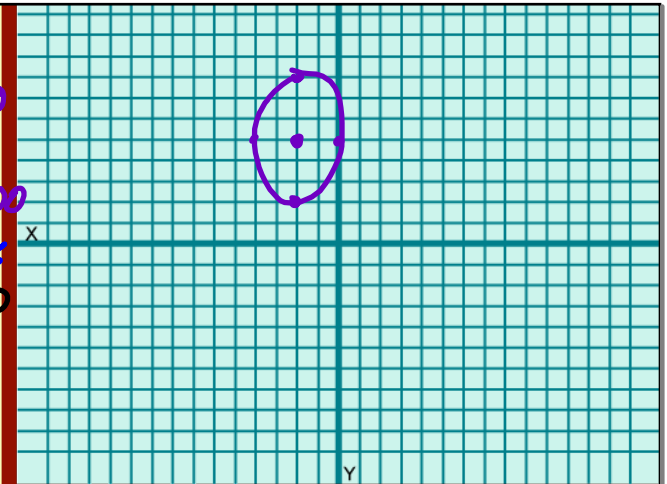
$$9(x+2)^2 + 4(y-5)^2 = 36$$

$$\frac{9(x+2)^2}{36} + \frac{4(y-5)^2}{36} = \frac{36}{36}$$

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

Center $(-2, 5)$
 $a^2 = 9 \quad a = 3$
 $b^2 = 4 \quad b = 2$

Vertical



Major = $2a = 2(3) = 6$
 Minor = $2b = 2(2) = 4$
 Foci: $(h, k \pm c)$
 $(-2, 5 \pm \sqrt{5})$

$$\begin{cases} c^2 = a^2 - b^2 \\ c^2 = 9 - 4 \\ c^2 = 5 \\ c = \sqrt{5} \end{cases}$$