

1. A circle whose center is at the point $(3, -7)$ and contains the point $(-9, -2)$.

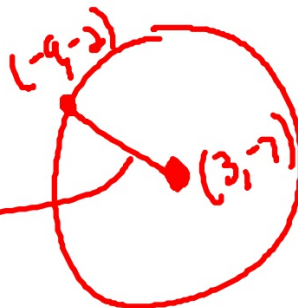
$$\text{Radius} = \sqrt{(-9-3)^2 + (-2+7)^2}$$

$$= \sqrt{144 + 25}$$

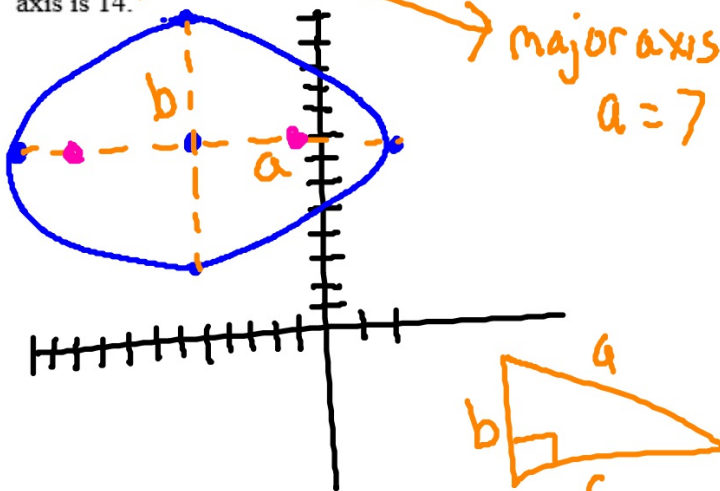
$$= \sqrt{169}$$

$$= 13$$

$$(x-3)^2 + (y+7)^2 = 169$$



2. An ellipse whose center is at the point $(-5, 8)$, the length of its minor axis is 8 and the length of its horizontal axis is 14.



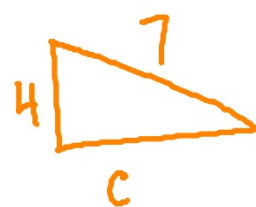
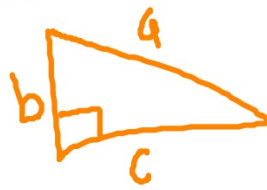
$$b=4$$

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

$$\frac{(x+5)^2}{49} + \frac{(y-8)^2}{16} = 1$$

$$\text{Foci: } (-5 \pm \sqrt{33}, 8)$$

$$V: (-12, 8)(2, 8)$$

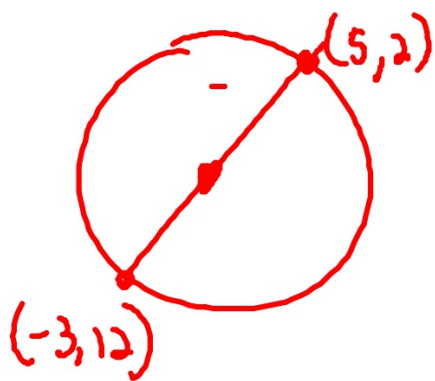


$$16 + c^2 = 49$$

$$c^2 = 33$$

$$c = \sqrt{33}$$

3. Circle with a diameter whose endpoints are $(-3, 12)$ and $(5, 2)$.



$$\text{Center: } \left(\frac{-3+5}{2}, \frac{12+2}{2} \right) \\ (1, 7)$$

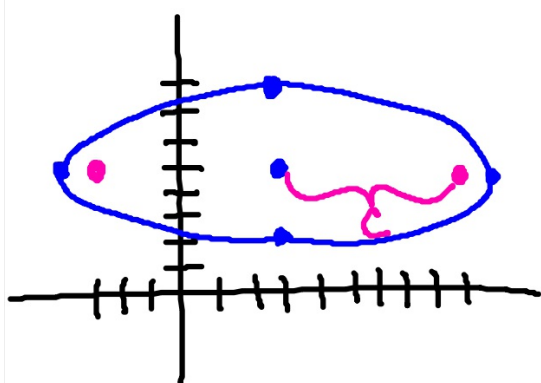
$$\text{Dist. Diam.} = \sqrt{(5+3)^2 + (2-12)^2}$$

$$(x-1)^2 + (y-7)^2 = 41$$

$$= \sqrt{64 + 100} = \sqrt{164} = 2\sqrt{41}$$

$$\text{Diam} = 2\sqrt{41} \\ \text{Radius} = \sqrt{41}$$

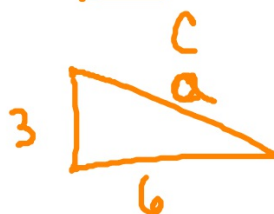
4. An ellipse whose center is at $(3, 5)$, the length of the ~~minor~~ minor axis is 6 and the foci are at the points $(9, 5)$ and $(-3, 5)$.



Vertices: $(3 \pm 3\sqrt{5}, 5)$

$$b=3$$

$$c=6$$



$$9 + 36 = a^2$$

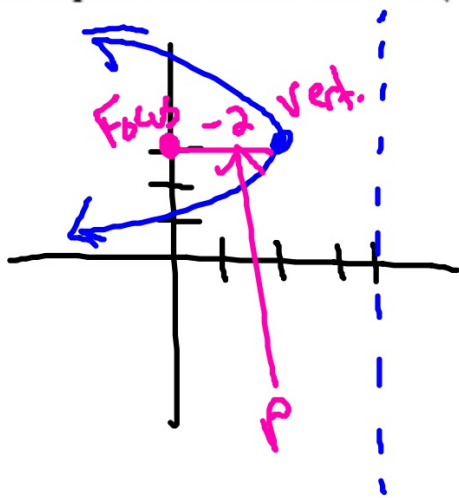
$$45 = a^2$$

$$a = \sqrt{45} = 3\sqrt{5}$$

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

$$\boxed{\frac{(x-3)^2}{45} + \frac{(y-5)^2}{9} = 1}$$

5. A parabola whose vertex is (2, 3) and whose directrix is the line $x = 4$.

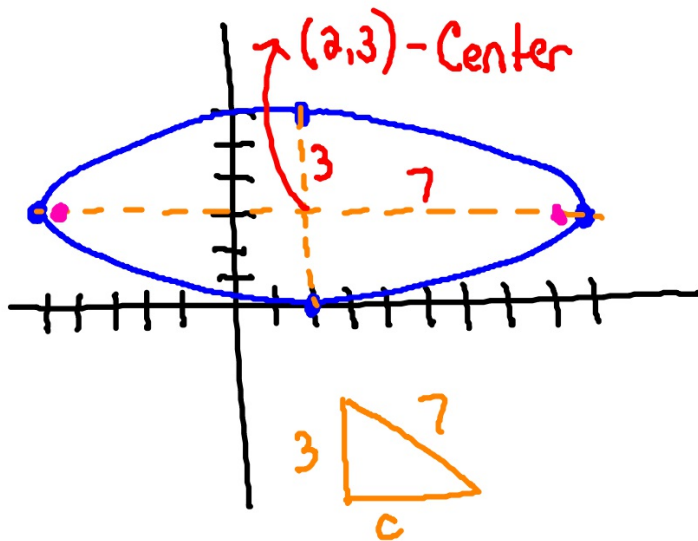


$$(y-k)^2 = 4p(x-h)$$

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

$$(y-3)^2 = -8(x-2)$$

6. An ellipse whose vertices are at $(9, 3)$, $(-5, 3)$, $(2, 6)$, $(2, 0)$.



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

$$\frac{(x-2)^2}{49} + \frac{(y-3)^2}{9} = 1$$

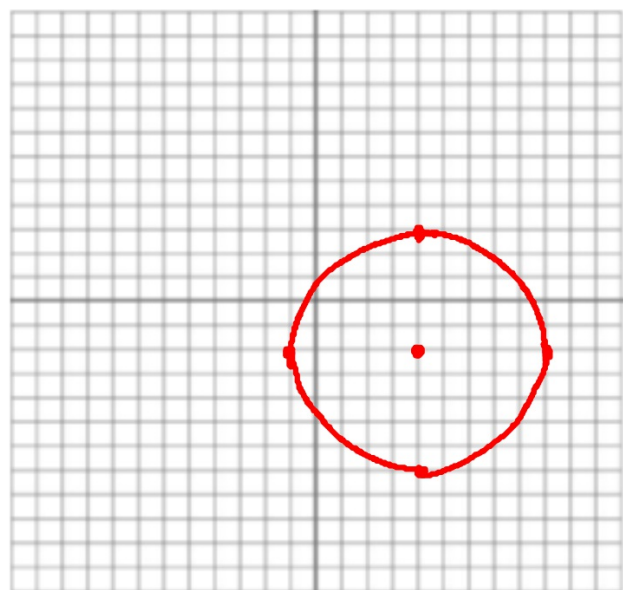
$$\begin{aligned} 9 + c^2 &= 49 \\ c^2 &= 40 \\ c &= 2\sqrt{10} \end{aligned}$$

$$\text{Foci: } (2 \pm 2\sqrt{10}, 3)$$

7. $(x-4)^2 + (y+2)^2 = 25$

Center: $(4, -2)$

$$r = 5$$



8. $\frac{(x+1)^2}{25} - \frac{(y-3)^2}{4} = 1$

Center: $(-1, 3)$

$a=5$ $5^2 + 2^2 = c^2$

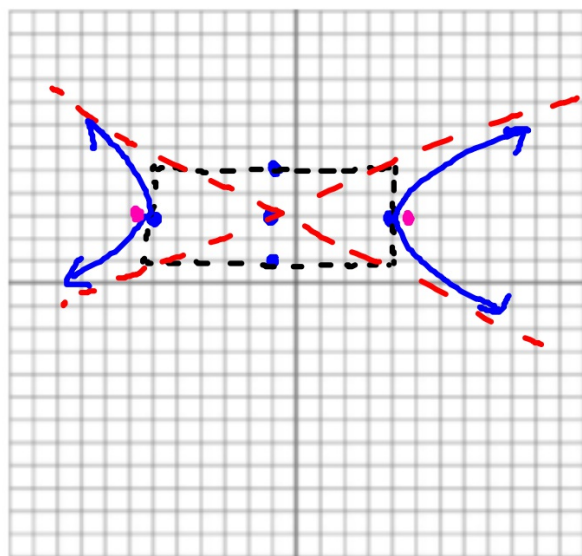
$b=2$ $25 + 4 = c^2$

$c = \sqrt{29}$ $29 = c^2$

V: $(-6, 3)$ $(4, 3)$

F: $(-1 \pm \sqrt{29}, 3)$

A: $y = 3 \pm \frac{2}{5}(x+1)$



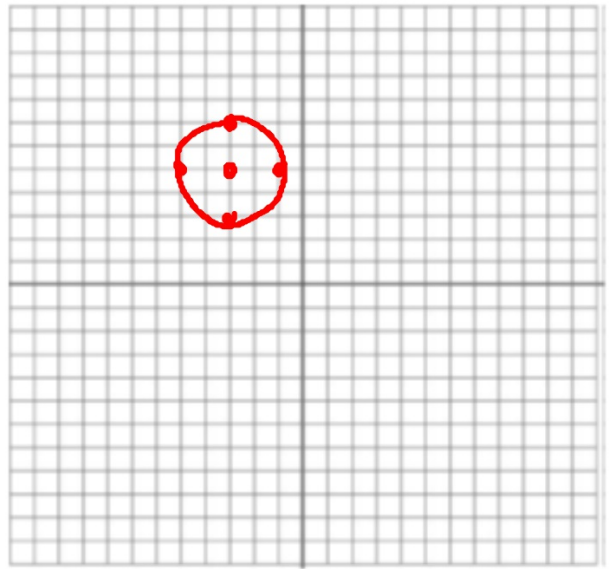
9. $x^2 + y^2 + 6x - 10y = -30$

$$x^2 + 6x + 9 + y^2 - 10y + 25 = -30 + 9 + 25$$

$$(x+3)^2 + (y-5)^2 = 4$$

Center $(-3, 5)$

$$r = 2$$

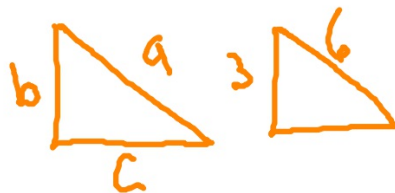


10. $\frac{(x-2)^2}{36} + \frac{(y-5)^2}{9} = 1$

Center: $(2, 5)$

$a = 6$

$b = 3$

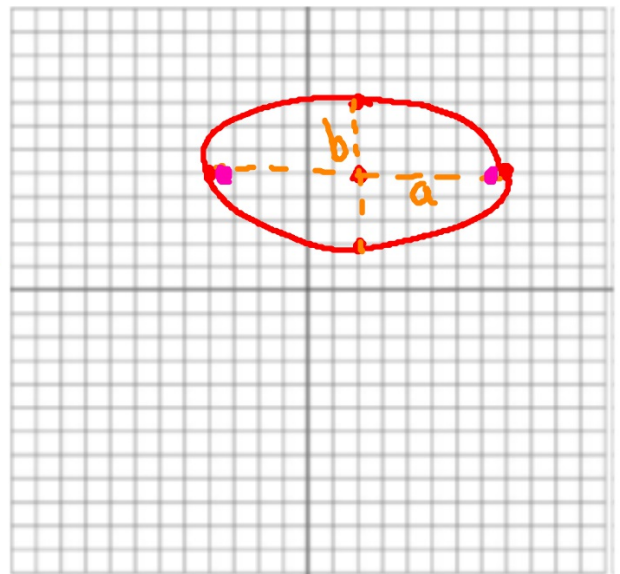


$c^2 + 9 = 36$

$c^2 = 27$

$c = 3\sqrt{3}$

Foci: $(2 \pm 3\sqrt{3}, 5)$

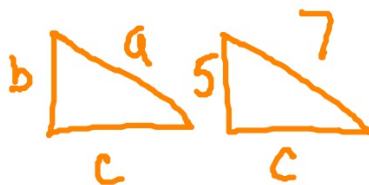


11. $\frac{(x+4)^2}{49} + \frac{(y-3)^2}{25} = 1$

Center: $(-4, 3)$

$a = 7$

$b = 5$



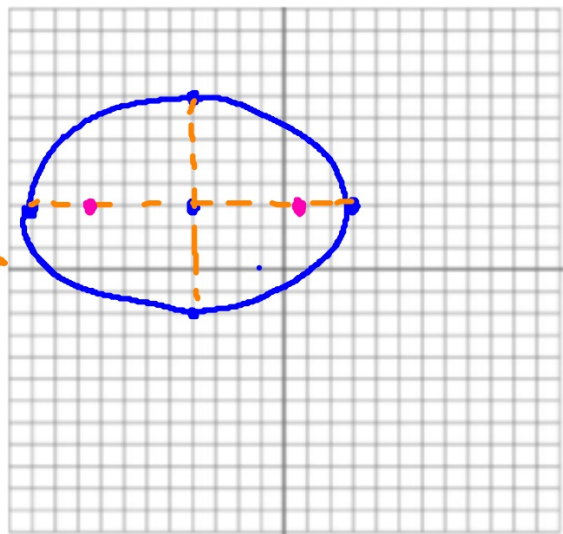
$25 + c^2 = 49$

$c^2 = 24$

$c = 2\sqrt{6}$

Foci: $(-4 \pm 2\sqrt{6}, 3)$

V: $(3, 3)$ $(-11, 3)$



12. $\frac{(y-2)^2}{25} - \frac{(x-5)^2}{4} = 1$

Center: $(5, 2)$

$a = 5$ $25 + 4 = c^2$

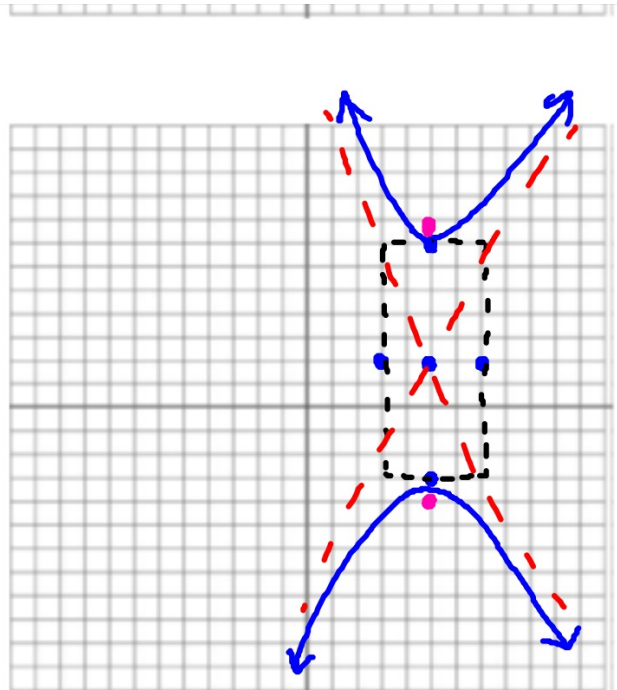
$b = 2$ $29 = c^2$

$c = \sqrt{29}$

V: $(5, 7), (5, -3)$

F: $(5, 2 \pm \sqrt{29})$

A: $y = 2 \pm \frac{5}{2}x$



13. $(x-3)^2 = 4(y+5)$

$$4p = 4$$

$$p = 1$$

$$V: (3, -5)$$

$$F: (3, -4)$$

$$D: y = -6$$

