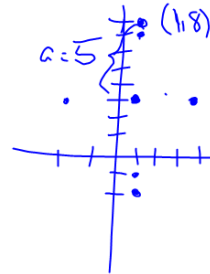


7. Write the equation of the ellipse that has center (1,3), the major axis is parallel to the y-axis, one vertex is (1,8) and $b = 3$. Then list the coordinates of the other vertices and the foci.



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

vertices (1,8) (1,-2)
(4,3) (-2,3)

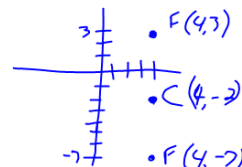
foci (1,7) (1,-1)

$$\begin{aligned} h &= 1 \\ k &= 3 \\ a &= 5 \\ b &= 3 \\ c &= 4 \end{aligned}$$

$$c^2 = 25 - 9$$

$$\begin{aligned} c^2 &= 16 \\ c &= 4 \end{aligned}$$

foci at (4,3) and (4,-7) and the length of the ^{vert.} major axis is 14.



$$\frac{(y+2)^2}{49} + \frac{(x-4)^2}{24} = 1$$

$$\begin{aligned} h &= 4 \\ k &= -2 \\ a &= 7 \\ b &= 2\sqrt{6} \\ c &= 5 \end{aligned}$$

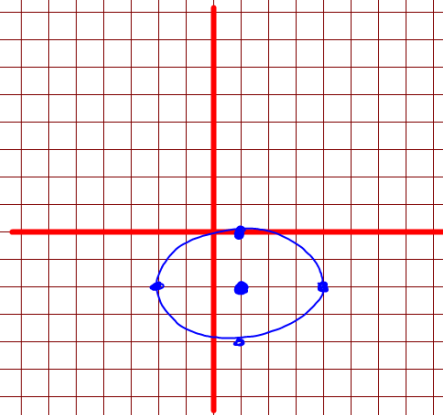
$$\begin{aligned} 4 &= -2a \\ 7 &= 9 \end{aligned}$$

$$\begin{aligned} \text{midpoint } &\left(\frac{4+4}{2}, \frac{7+(-7)}{2}\right) \\ &(4, -2) \end{aligned}$$

$$\begin{aligned} c^2 &= a^2 - b^2 \\ 25 &= 49 - b^2 \\ b^2 &= 24 \\ b &= 2\sqrt{6} \end{aligned}$$

center (4,-2)

vertices
(4,5) (4,-9)
(4+2*sqrt(6), -2)
(4-2*sqrt(6), -2)



$$a=3$$

$$b=2$$

$$4x^2 + 9y^2 - 8x + 36y + 4 = 0$$

$$4(x^2 - 2x + 1) + 9(y^2 + 4y + 4) = -4 + 4(1) + 9(4)$$

$$\frac{4(x-1)^2}{36} + \frac{9(y+2)^2}{36} = \frac{36}{36}$$

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

center (1, -2)

vertices (4, -2) (-2, -2)
(1, 0) (1, -4)

foci (1 ± √5, -2)

$$h=1$$

$$k=-2$$

$$a=3$$

$$b=2$$

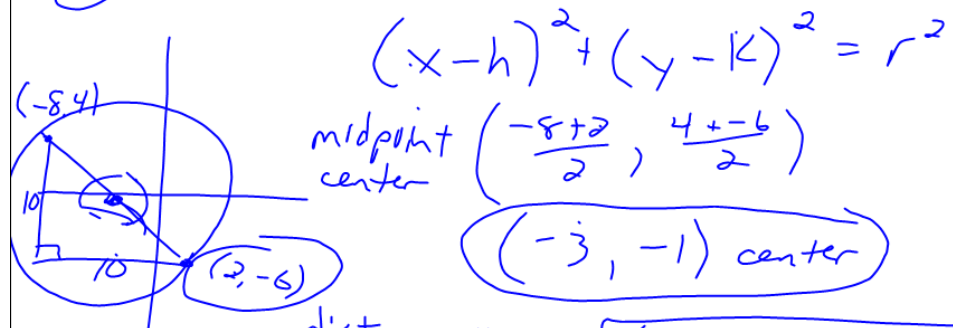
$$c=\sqrt{5}$$

$$c^2 = 9 - 4$$

$$c^2 = 5$$

$$c = \sqrt{5}$$

⑤ diam $(-8, 4)$ $(2, -6)$



$$\text{dist} = \text{radius} = \sqrt{(2+3)^2 + (-6+1)^2}$$

$$= \sqrt{50}$$

$$r = 5\sqrt{2}$$

$$(x+3)^2 + (y+1)^2 = 50$$

② $(n+2, 3)$ $(n-2, -5)$

$$\text{dist} = \sqrt{\left((n-2) - \underbrace{(n+2)}_{(-4)}\right)^2 + (-5-3)^2}$$

$$\sqrt{16 + 64}$$

$$\sqrt{80}$$

$$\sqrt{16} \sqrt{5}$$

$$d = 4\sqrt{5}$$