

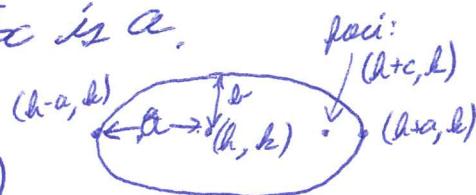
Standard Form of the Equation of an Ellipse with center (h, k)

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

When $a > b$, the major axis is horizontal ($\leftrightarrow$) so the distance from the center to the vertex is a .

vertices: $(h \pm a, k)$

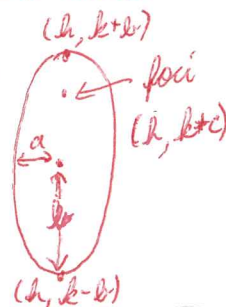
for foci: $c^2 = a^2 - b^2$ and $(h \pm c, k)$



When $b > a$, the major axis is vertical ($\updownarrow$) so the distance from the center to the vertex is b .

vertices: $(h, k \pm b)$

for foci: $c^2 = b^2 - a^2$ and $(h, k \pm c)$

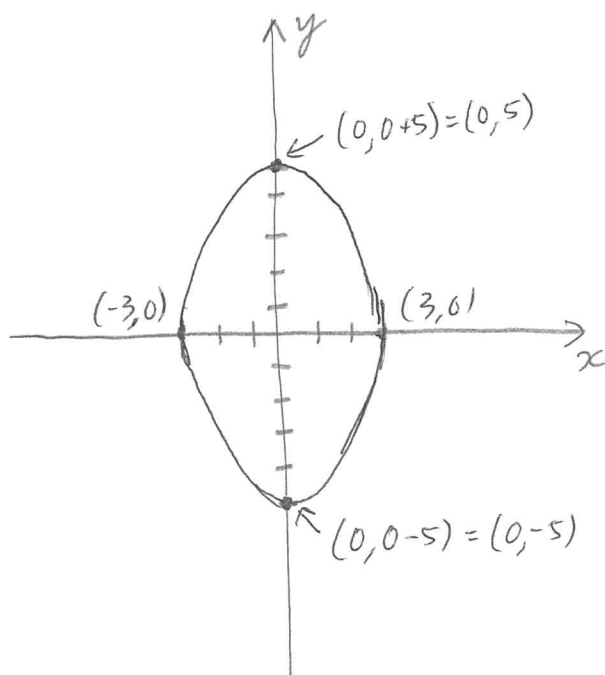


100) $\frac{x^2}{9} + \frac{y^2}{25} = 1$

$$\frac{(x-(0))^2}{(3)^2} + \frac{(y-(0))^2}{(5)^2} = 1$$

center $(0, 0)$

$a = 3 < b = 5$

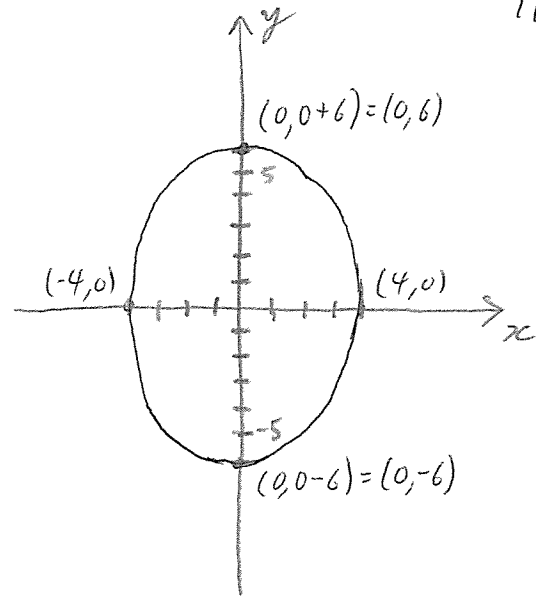


$$102) \frac{x^2}{16} + \frac{y^2}{36} = 1$$

$$\frac{(x-(0))^2}{(4)^2} + \frac{(y-(0))^2}{(6)^2} = 1$$

center: $(0,0)$

$$a=4 < b=6$$

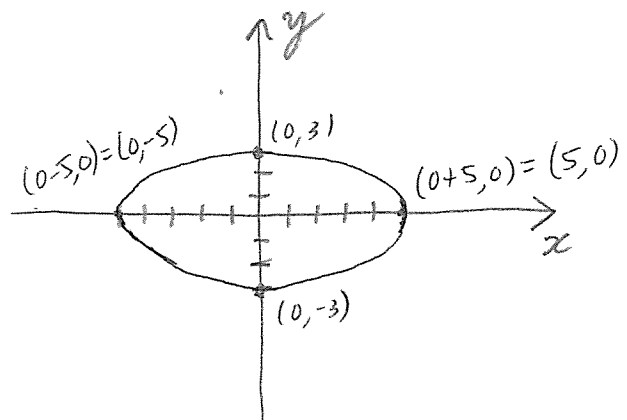


$$104) \frac{x^2}{25} + \frac{y^2}{9} = 1$$

$$\frac{(x-(0))^2}{(5)^2} + \frac{(y-(0))^2}{(3)^2} = 1$$

center: $(0,0)$

$$a=5 > b=3$$

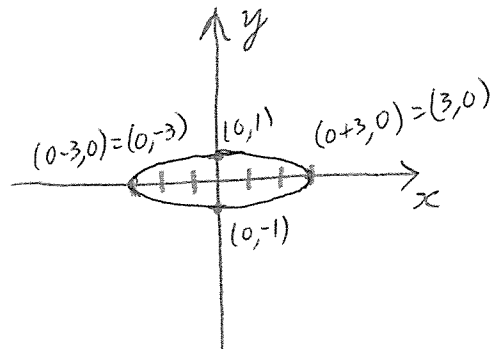
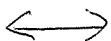


$$106) \frac{x^2}{9} + y^2 = 1$$

$$\frac{(x-(0))^2}{(3)^2} + \frac{(y-(0))^2}{(1)^2} = 1$$

center: $(0,0)$

$$a=3 > b=1$$



$$108) 16x^2 + 9y^2 = 144$$

11,3 3

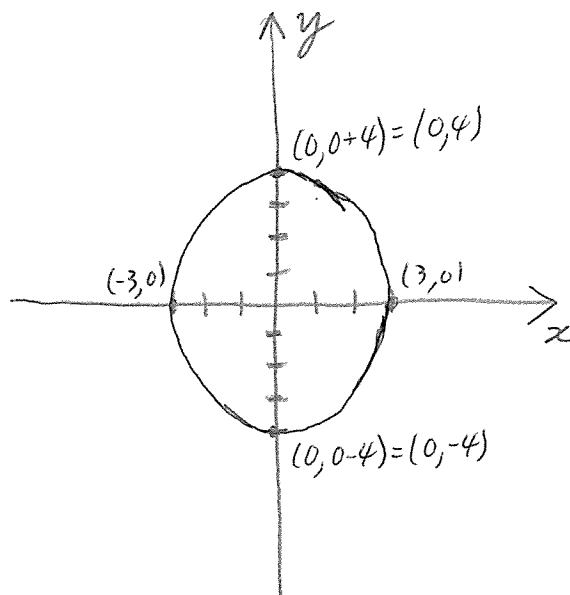
$$\frac{16x^2}{144} + \frac{9y^2}{144} = \frac{144}{144}$$

$$\frac{x^2}{9} + \frac{y^2}{16} = 1$$

$$\frac{(x-(0))^2}{(3)^2} + \frac{(y-(0))^2}{(4)^2} = 1$$

center: $(0,0)$

$$a=3 < b=4$$



$$110) 9x^2 + 25y^2 = 225$$

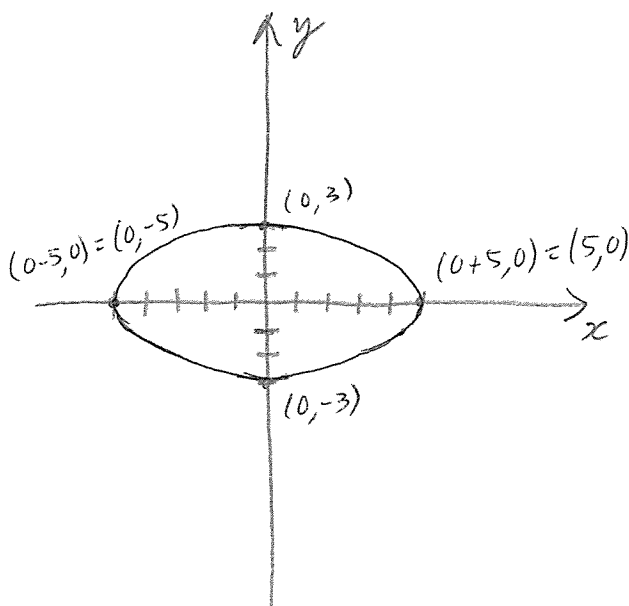
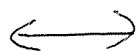
$$\frac{9x^2}{225} + \frac{25y^2}{225} = \frac{225}{225}$$

$$\frac{x^2}{25} + \frac{y^2}{9} = 1$$

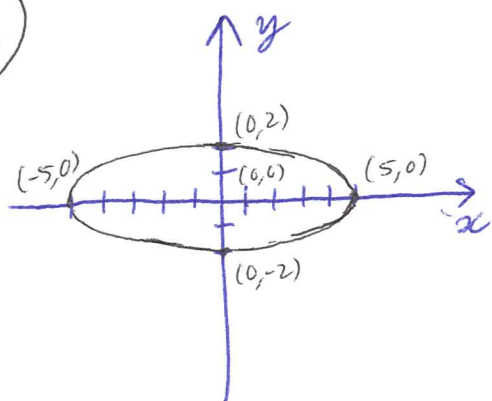
$$\frac{(x-(0))^2}{(5)^2} + \frac{(y-(0))^2}{(3)^2} = 1$$

center: $(0,0)$

$$a=5 > b=3$$



112)



center: (0,0)

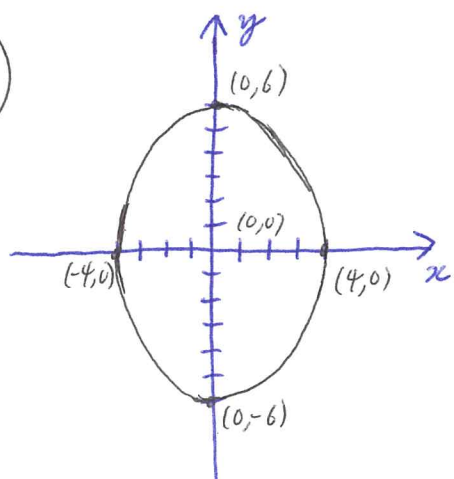
$$a=5 \quad b=2$$

$$\frac{(x-(0))^2}{(5)^2} + \frac{(y-(0))^2}{(2)^2} = 1$$

$$\frac{x^2}{25} + \frac{y^2}{4} = 1$$

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114)



center: (0,0)

$$a=4 \quad b=6$$

$$\frac{(x-(0))^2}{(4)^2} + \frac{(y-(0))^2}{(6)^2} = 1$$

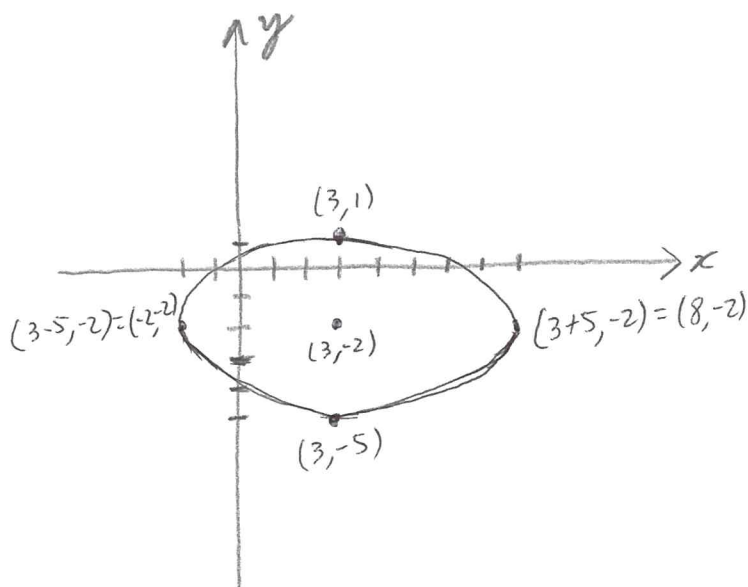
$$\frac{x^2}{16} + \frac{y^2}{36} = 1$$

$$116) \frac{(x-3)^2}{25} + \frac{(y+2)^2}{9} = 1$$

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

center: (3, -2)

$$a=5 > b=3$$

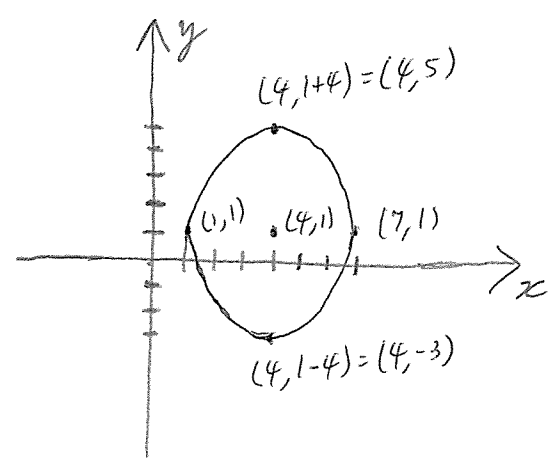


$$118) \frac{(x-4)^2}{9} + \frac{(y-1)^2}{16} = 1$$

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

center: (4,1)

$$a=3 < b=4$$

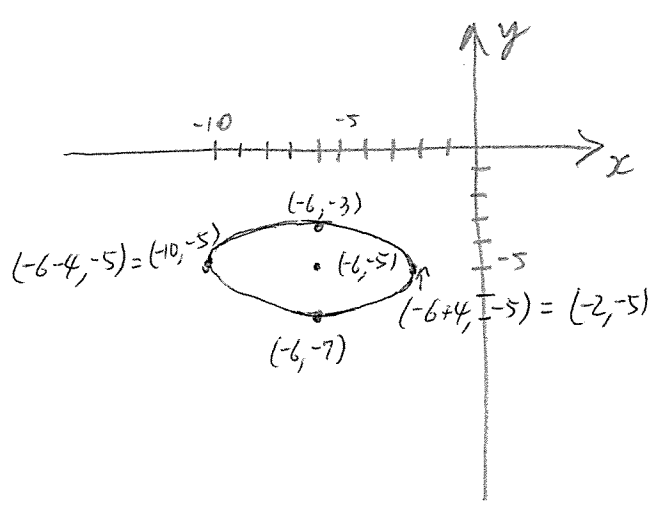


$$120) \frac{(x+6)^2}{16} + \frac{(y+5)^2}{4} = 1$$

$$\frac{(x-(-6))^2}{(4)^2} + \frac{(y-(-5))^2}{(2)^2} = 1$$

center: (-6,-5)

$$a=4 > b=2$$

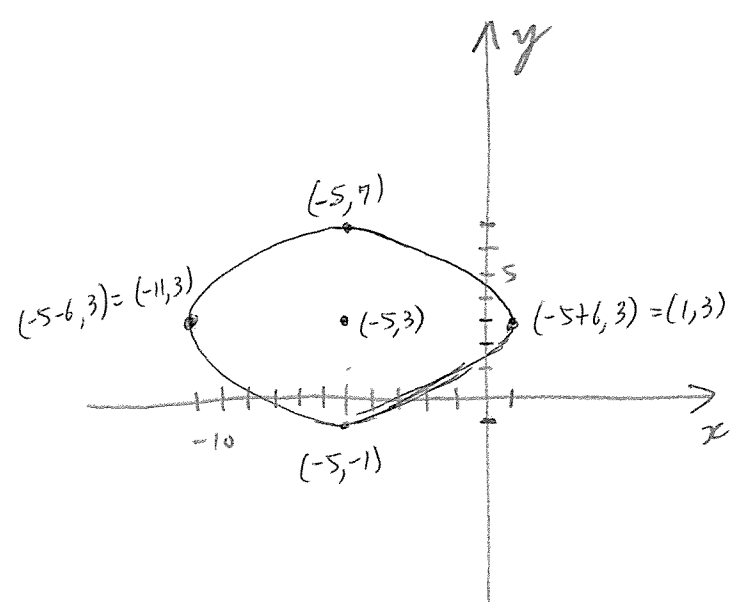
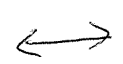


$$122) \frac{(x+5)^2}{36} + \frac{(y-3)^2}{16} = 1$$

$$\frac{(x-(-5))^2}{(6)^2} + \frac{(y-(3))^2}{(4)^2} = 1$$

center: (-5,3)

$$a=6 > b=4$$



$$124) \quad 4x^2 + 25y^2 + 8x + 100y + 4 = 0$$

$$\frac{dx}{2} = \frac{2}{2} = 1 \quad 4x^2 + 8x + 25y^2 + 100y = -4$$

$$\left(\frac{dx}{2}\right) = (1)^2 = 1 \quad 4(x^2 + 2x) + 25(y^2 + 4y) = -4$$

$$4(x^2 + 2x + 1) + 25(y^2 + 4y + 4) = -4 + 4(1) + 25(4)$$

$$4(x+1)^2 + 25(y+2)^2 = 100$$

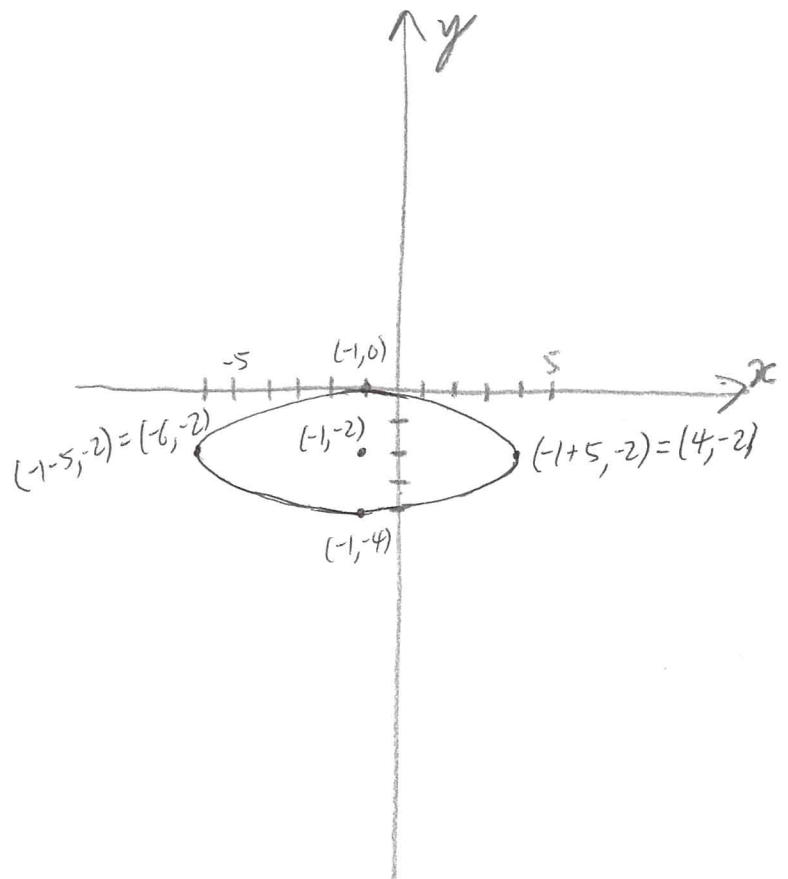
$$\frac{4(x+1)^2}{100} + \frac{25(y+2)^2}{100} = \frac{100}{100}$$

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

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

Center: $(-1, -2)$

$$a = 5 > b = 2$$



$$126) \quad 9x^2 + 4y^2 + 56y + 160 = 0$$

$$9x^2 + 4y^2 + 56y = -160$$

$$9x^2 + 4(y^2 + 14y) = -160$$

$$9x^2 + 4(y^2 + 14y + 49) = -160 + 4(49)$$

$$9x^2 + 4(y+7)^2 = 36$$

$$\frac{9x^2}{36} + \frac{4(y+7)^2}{36} = \frac{36}{36}$$

$$\frac{x^2}{4} + \frac{(y+7)^2}{9} = 1$$

$$\frac{(x-0)^2}{(2)^2} + \frac{(y-(-7))^2}{(3)^2} = 1$$

center: $(0, -7)$

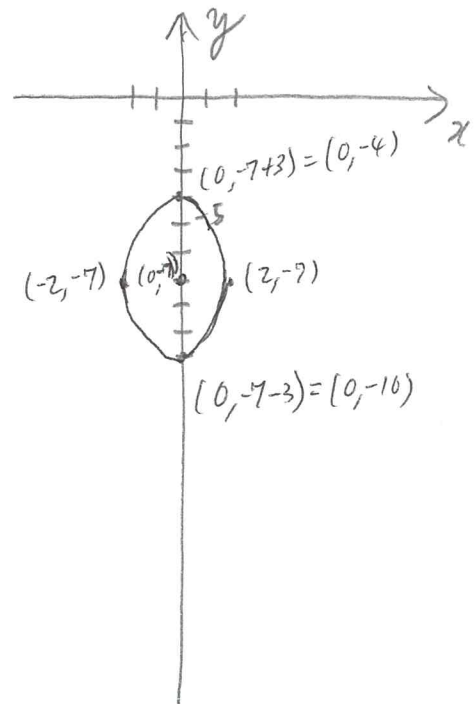
$$a = 2 < b = 3$$



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$$\frac{b-y}{2} = \frac{14}{2} = 7$$

$$\left(\frac{b-y}{2}\right)^2 = (7)^2 = 49$$



Omitted 127, 130, 134, 137
these are parabolas

$$128) \quad x^2 + y^2 = 49$$

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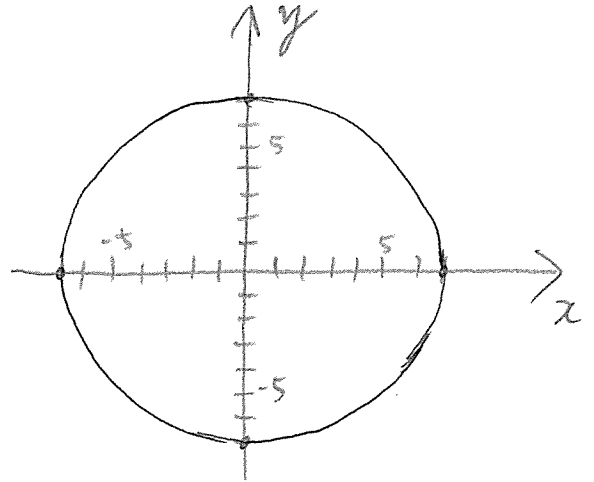
$$\frac{x^2}{49} + \frac{y^2}{49} = \frac{49}{49}$$

$$\frac{(x-(0))^2}{(7)^2} + \frac{(y-(0))^2}{(7)^2} = 1$$

center: $(0,0)$

$$a=7=b=7$$

this is a circle: $r=7$



$$132) \quad (x-2)^2 + (y-3)^2 = 9$$

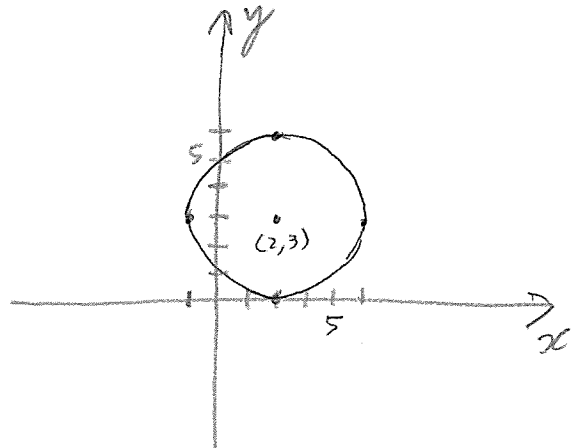
$$\frac{(x-2)^2}{9} + \frac{(y-3)^2}{9} = \frac{9}{9}$$

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

center: $(2,3)$

$$a=3=b=3$$

this is a circle: $r=3$

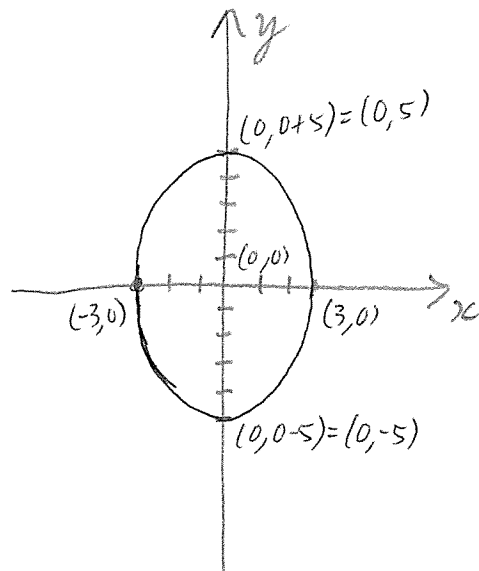


$$136) \quad \frac{x^2}{9} + \frac{y^2}{25} = 1$$

$$\frac{(x-(0))^2}{(3)^2} + \frac{(y-(0))^2}{(5)^2} = 1$$

center: $(0,0)$

$$a=3 < b=5$$



$$138) \quad \frac{(x-2)^2}{9} + \frac{(y+3)^2}{25} = 1$$

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

Center: $(2, -3)$

$$a = 3 < b = 5$$



11.3 [9]

