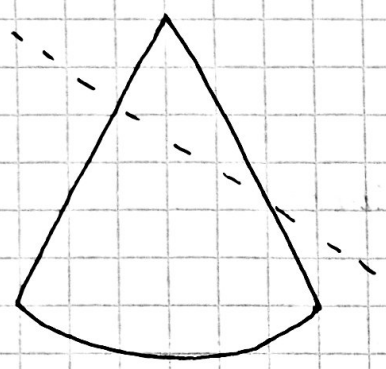
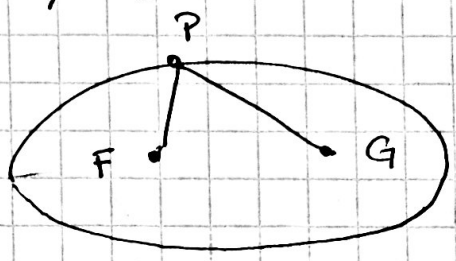
9.3 Ellipses

Ellipse: The set of all points whose distance from 2 fixed points (foci) add up to a constants





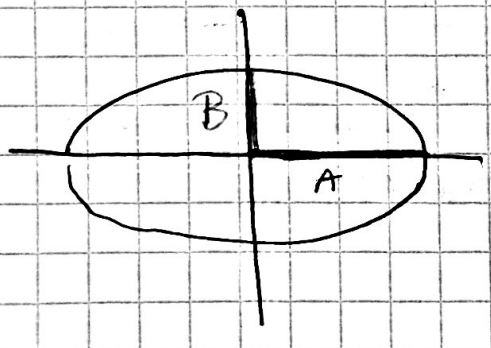
$FP + PG = 2a$
for any point P on the parabola

Major axis: the longer of the 2 diameters

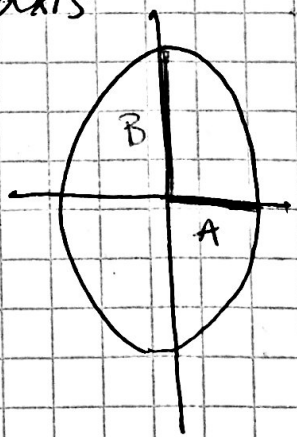
Semi-major axis: longer radius, half the major axis

Minor axis: the shorter diameter

Semi-minor axis: shorter radius half the minor axis



Horizontal



Vertical

Standard Form:

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

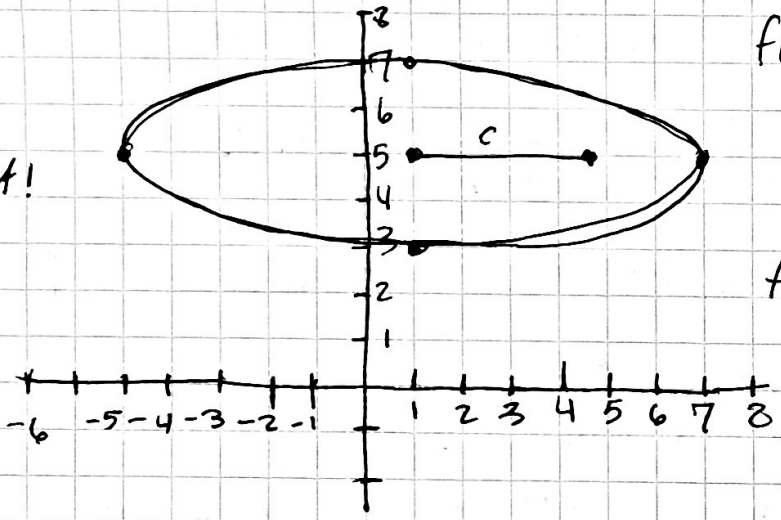
(h, K): center
a: horizontal radius
b: vertical radius

vertical radius : 2
horizontal radius : 6

major axis : 12
minor axis : 4

vertex : (1, 5)

a : 6
b : 2



foci : $c^2 = |36 - 4|$

$c^2 = 32$

$c = 4\sqrt{2}$

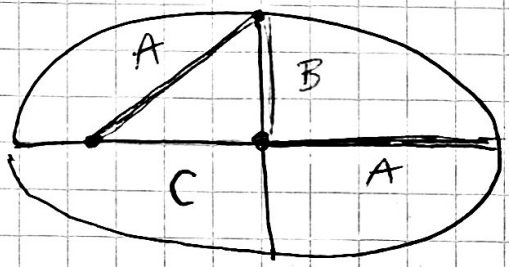
foci : $(1 - 4\sqrt{2}, 5)$
$(1 + 4\sqrt{2}, 5)$

$e = \frac{4\sqrt{2}}{6}$

$\approx .94$

awesome!
did it!
feeling great!

Cones of dunshire shirt brings conic lick



c : distance from focus

the distance from ● to c is equal to a

to find the foci, add c to x in the center

Eccentricity - how uncircular a shape is

Circle has eccentricity of 0

Elipse : $0 < e < 1$

$e = \frac{c}{a}$ or $e = \frac{c}{b}$ depending on which is the semi-major axis

Translation : devide by the bigger one

Foci : (10, 9) (-16, 9) Vertices : (9, 9) (15, 9)

horizontal
center: (-3, 9)

$a = 13$ distance from center to vertex

$C = 12$ distance from center to focus

$b =$

$13^2 - 12^2 = b^2$

$13^2 = |12^2 - b^2|$

oh wait no!

got me all mixed up

b) $36x^2 + 4y^2$

$$36x^2 + 4y^2 + 144x - 4y + 1 = 0$$

$$36x^2 + 144x \_\_\_ + 4y^2 - 4y \_\_\_$$

$$36(x^2 + 4x) \; 4(y^2 - y) = -1$$

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

$$2^2 = 4 \qquad \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$\cancel{(x^2+4)^2} \qquad 36(x+2)^2 + 4\left(y - \tfrac{1}{2}\right)^2 = 143$$

$$+144 \qquad +1 \qquad 144$$

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