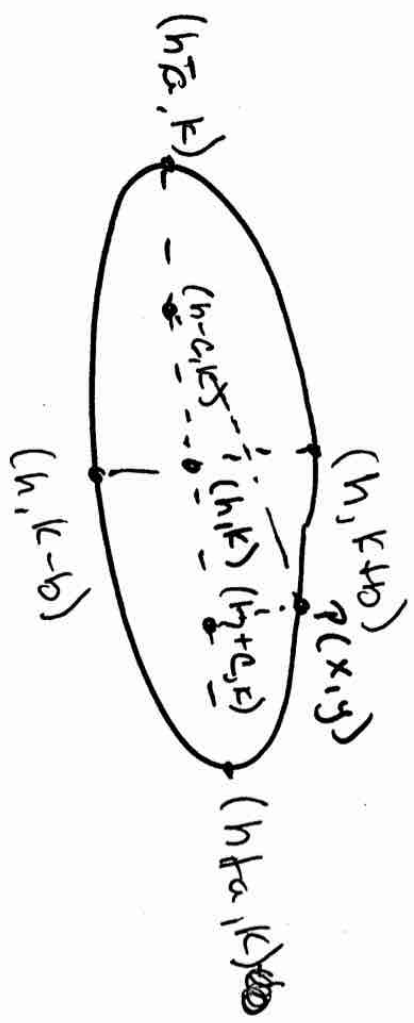


1. Find coordinates in terms of h, k, a, b, c

2. Set up equation in terms of focus & ellipse

~~Write coordinate representation~~



Needs to be at the end.

$$\sqrt{(x-(h-c))^2 + (y-k)^2} + \sqrt{(x-(h+c))^2 + (y-k)^2} = 2a$$

$$\left(\sqrt{(x-h+c)^2 + (y-k)^2} \right)^2 = 2a - \sqrt{(x-h-c)^2 + (y-k)^2}$$

- Square both sides

$$((x-h+c)^2 + (y-k)^2) = 4a^2 - 4a \sqrt{(x-h-c)^2 + (y-k)^2} + ((x-h-c)^2 + (y-k)^2)$$

* Cant cancel so expand to.

$$(x-h)^2 + 2(x-h)c + c^2 = 4a^2 - 4a \sqrt{(x-h-c)^2 + (y-k)^2} + (x-h)^2 - 2a(x-h) + a^2$$

$$\frac{4c(x-h)}{4} = \frac{4a^2 - 4a \sqrt{(x-h-c)^2 + (y-k)^2}}{4}$$

$$c(x-h)^2 = a^2 - a\sqrt{(x-h)^2 + (y-k)^2}$$

* Square each side
reorganize first otherwise
won't get rid of $\sqrt{\quad}$

$$\left(a\sqrt{(x-h)^2 + (y-k)^2} \right)^2 = \left(a^2 - c(x-h) \right)^2$$

$$a^2((x-h)^2 + (y-k)^2) = a^4 - 2a^2c(x-h) + c^2(x-h)^2$$

Expand

$$a^2((x-h)^2 - 2c(x-h) + c^2) + c^2(x-h)^2 = a^4 - 2a^2c(x-h) + c^2(x-h)^2$$

$$a^2(x-h)^2 - 2a^2c(x-h) + a^2c^2 + c^2(x-h)^2 = a^4 - 2a^2c(x-h) + c^2(x-h)^2$$

$$a^2(x-h)^2 - c^2(x-h)^2 + c^2(y-k)^2 = a^4 - a^2c^2$$

Factor out a^2

$$(x-h)^2(a^2 - c^2) + a^2(y-k)^2 = a^2(a^2 - c^2)$$

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

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

* rearrange so
parameters
terms are on
one side

$$a^2 - c^2 = b^2$$