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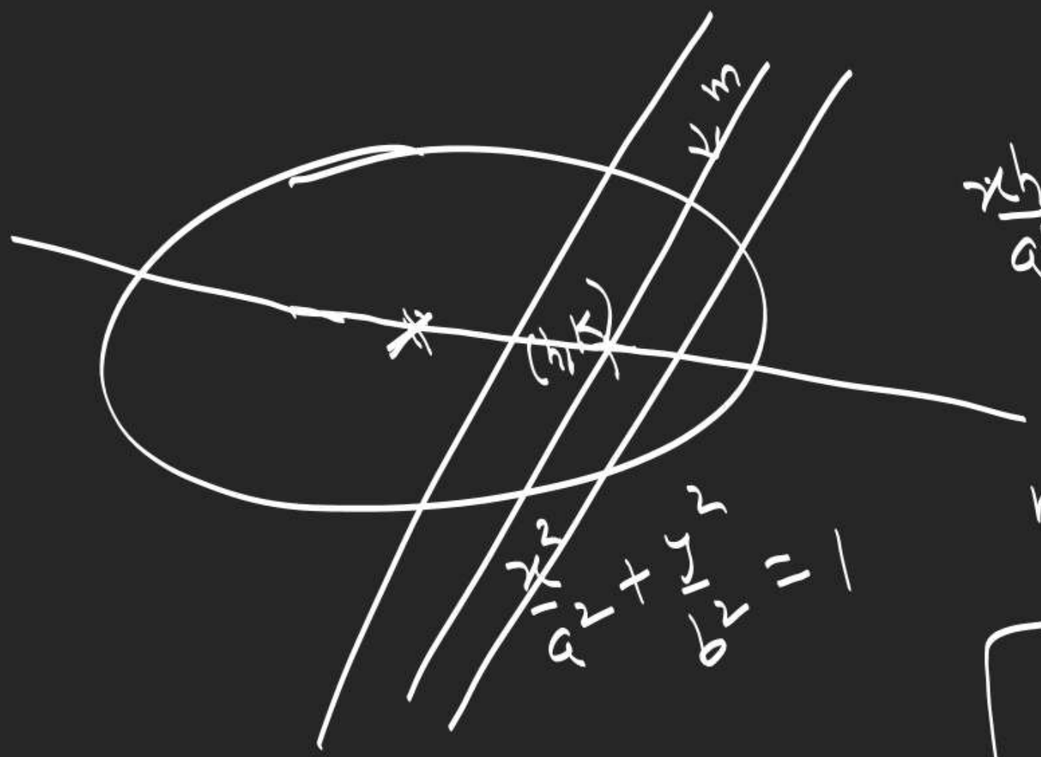
Diameter of Ellipse.



$$\frac{xh}{a^2}+\frac{yk}{b^2}-1=\frac{h^2}{a^2}+\frac{k^2}{b^2}-1$$

$$m=-\frac{hb^2}{a^2k}$$

$$y=-\frac{b^2}{a^2m}x$$

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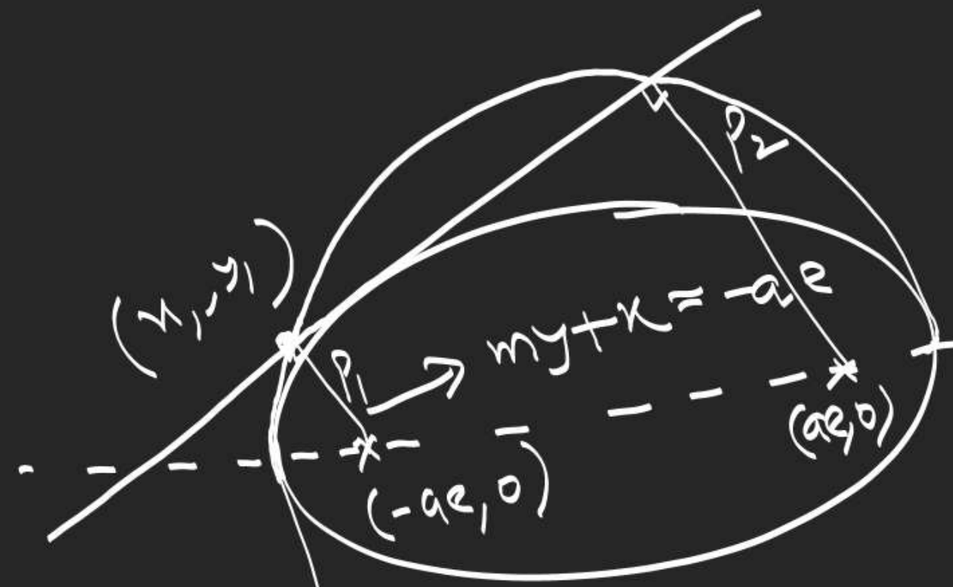
Note → (1)



$y = mx \pm \sqrt{a^2m^2 + b^2}$

$x_1^2 + y_1^2 = a^2$

$P_1P_2 = b^2$

$y_1 - mx_1 = \sqrt{a^2m^2 + b^2}$

$my_1 + x_1 = -ae.$

$(y_1^2 + x_1^2)(1 + m^2) = a^2m^2 + \cancel{b^2} + a^2 - \cancel{b^2}$

$P_1P_2 = \dfrac{\left|\left(-mae + \sqrt{a^2m^2 + b^2}\right)\left(mae + \sqrt{a^2m^2 + b^2}\right)\right|}{(1 + m^2)}$

$= \dfrac{\left|a^2m^2 + b^2 - m^2(a^2 - b^2)\right|}{1 + m^2}$

$= b^2.$

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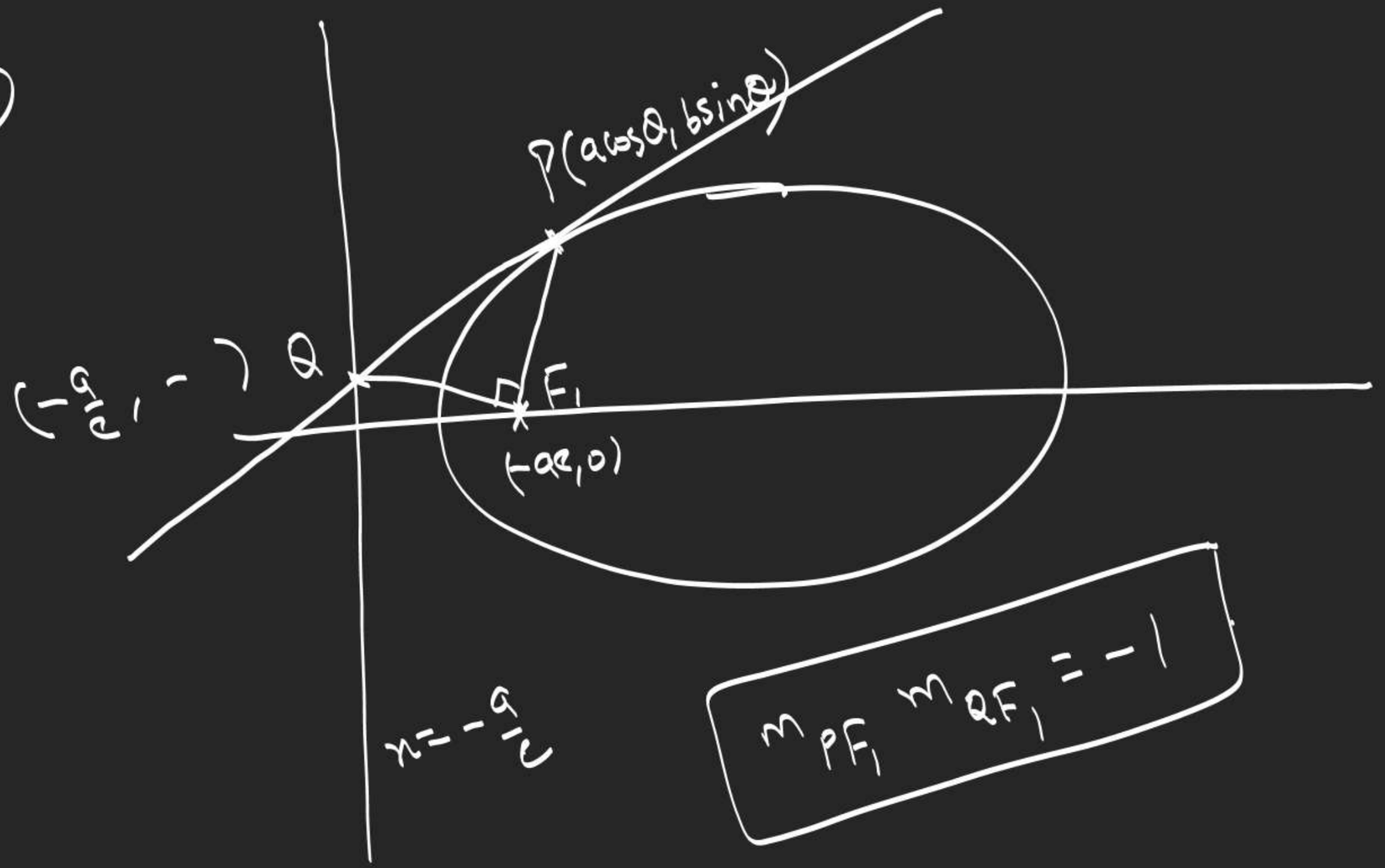
(2')



$$m_{PF_1} \, m_{QF_1} = -1$$

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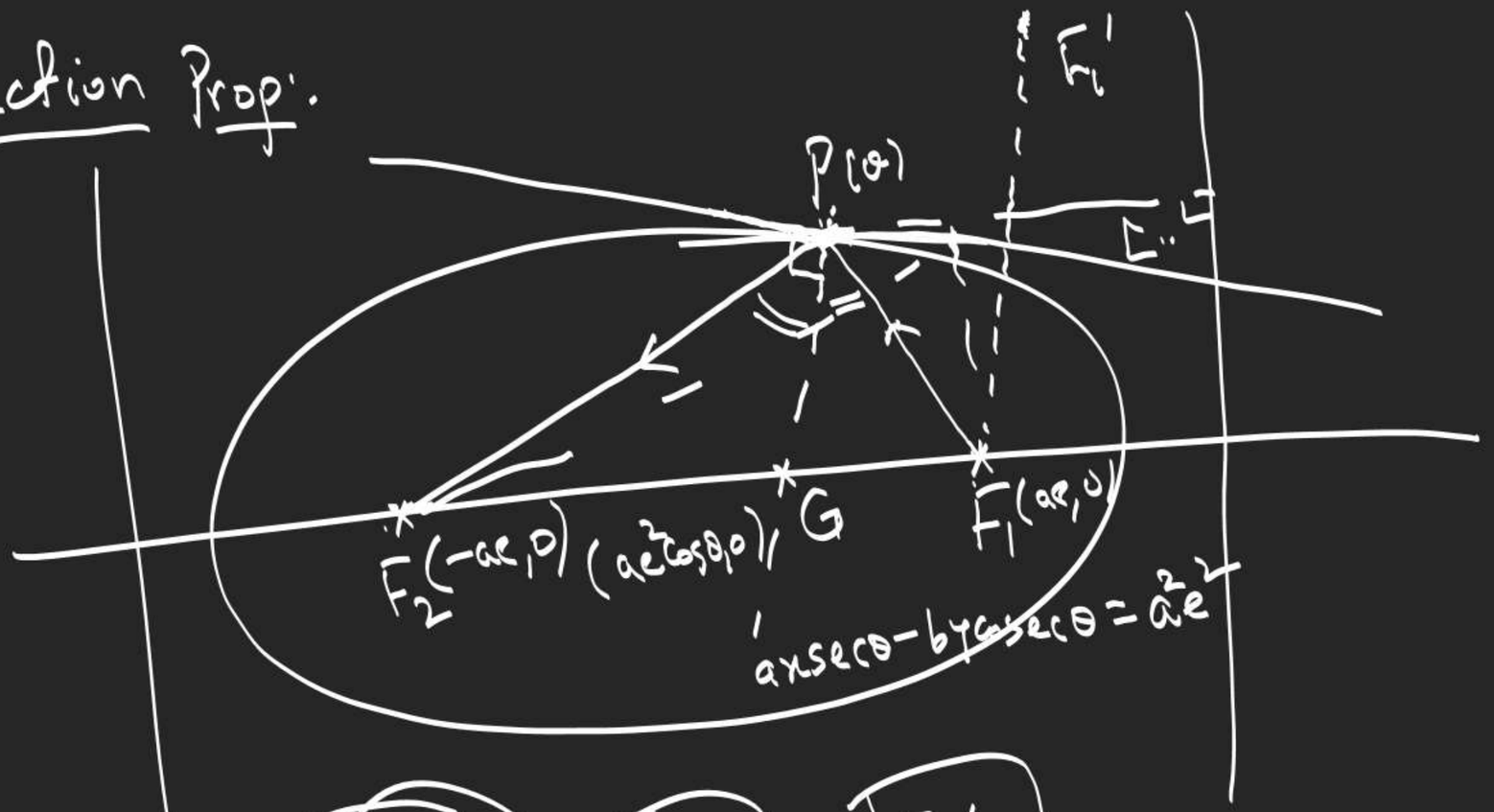
(3.) Reflection Prop.



$$\frac{e\left(\frac{a}{e}-a\cos\theta\right)}{e\left(a\cos\theta+\frac{a}{e}\right)} = \frac{F_1P}{F_2P} = \frac{F_1G}{F_2G}$$

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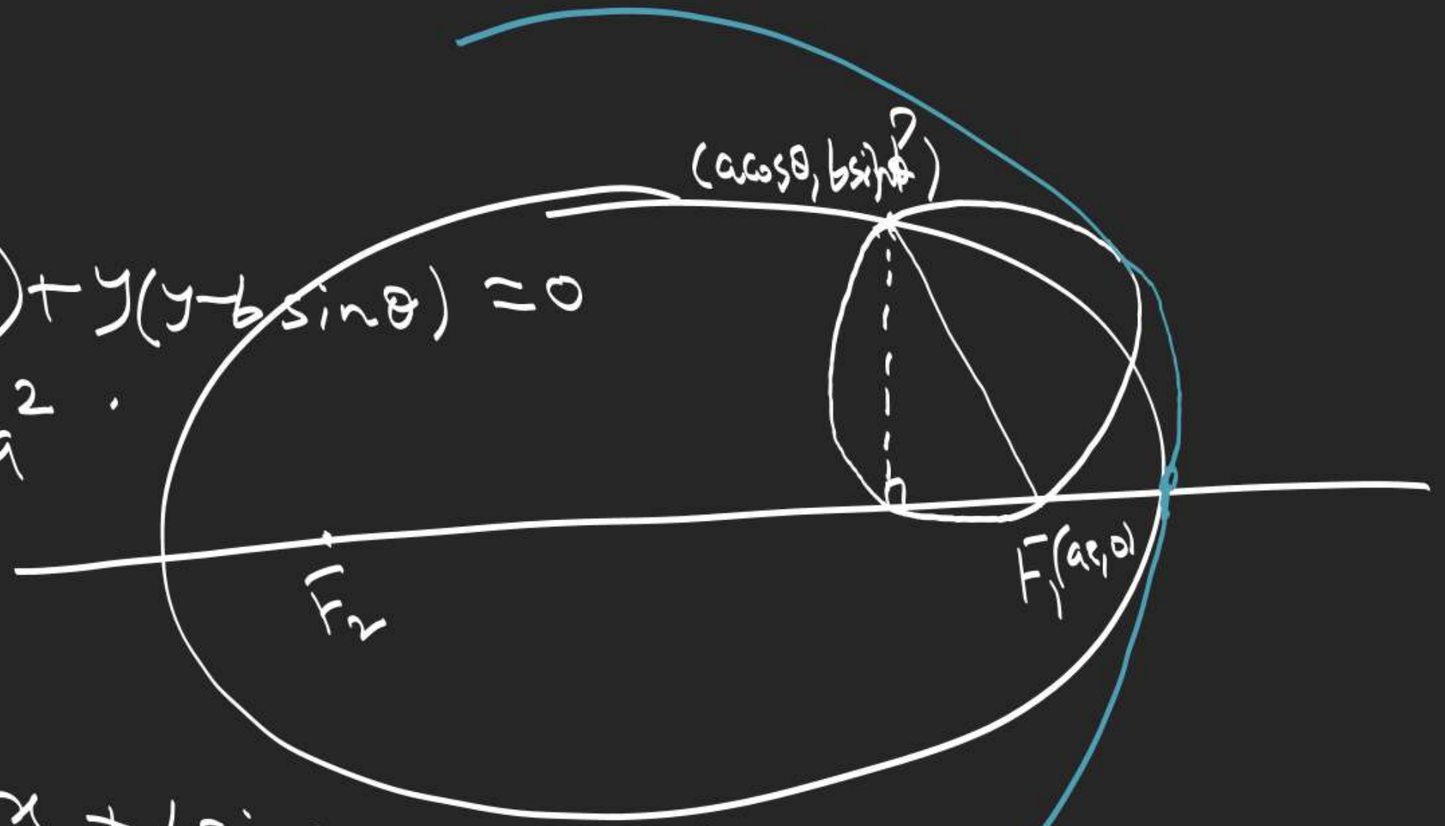
(4)



$$(x-ae)(x-a\cos\theta)+y(y-b\sin\theta)=0$$

$$x^2+y^2=a^2.$$

R.A →

$$(ae+a\cos\theta)x+b\sin\theta\, y-a^2-a^2e\cos\theta=0.$$

$$p=\frac{a^2\left|(1+e\cos\theta)\right|}{\sqrt{a^2(e^2+\cos^2\theta+2e\cos\theta)+a^2(1-e^2)\sin^2\theta}}=\frac{\left|a^2(1+e\cos\theta)\right|}{\sqrt{a^2e^2\cos^2\theta+a^2+2a^2e\cos\theta}}$$

$$=a(1+e\cos\theta)^2$$

$$=a.$$

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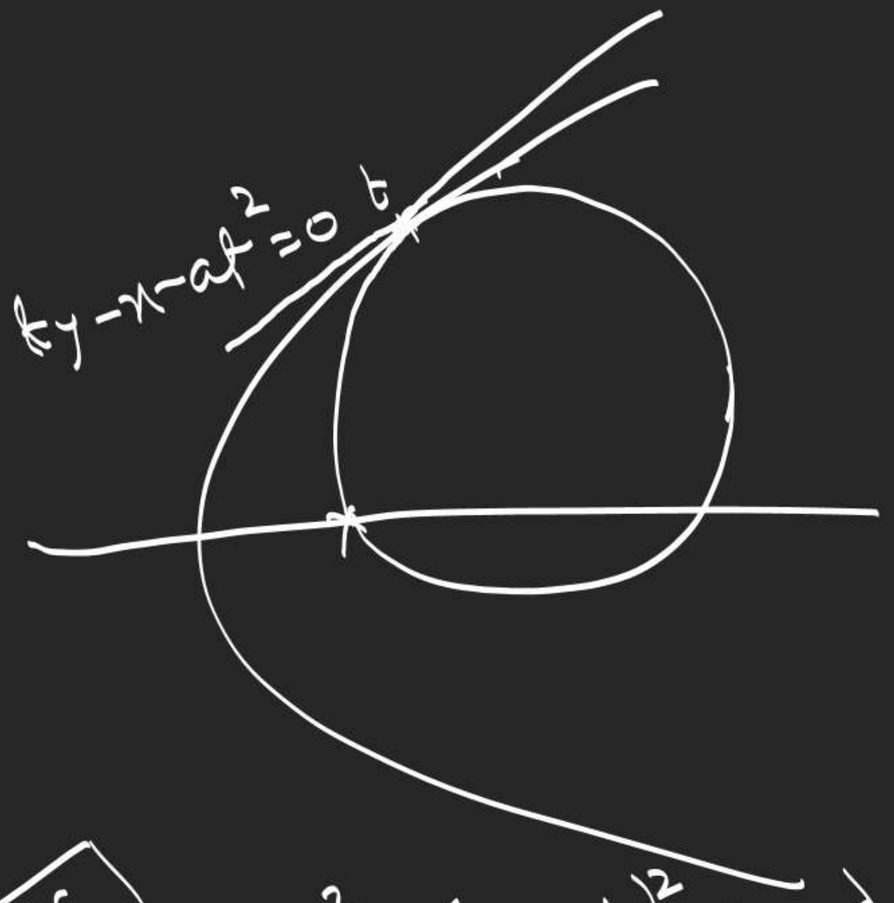
Paper-1

Ex-2(1-10)

↓

Probability



48 min

2:03 hr.

Problems

↓

Ellipse

pdf

$(x-aq^2)^2+(y-2at)^2+\lambda(ty-x-aq^2)=0$

Put $(a,0)$: $\lambda=?$