$$rac{x^2}{a^2} + rac{y^2}{b^2} = 1 (a,b>0)$$

$$\frac{1}{4}$$
 $\frac{1}{3}$ $\frac{1}{2}$

a, b

$$lacksquare$$
 $a > b$

$$(-c,0),(c,0)$$

$$lacksquare$$
 $a < b$

$$(0,c),(0,-c)$$

$$M(1,1)$$
 $-\frac{1}{2}$

$$-\frac{1}{2}$$

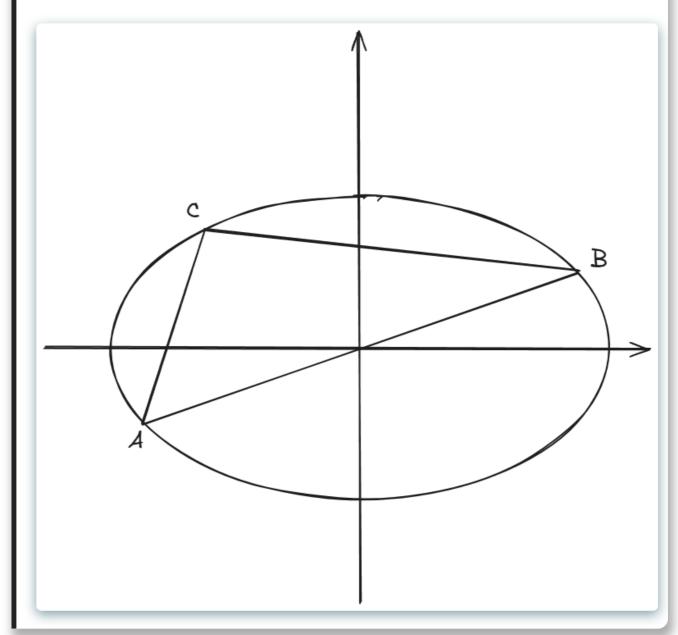
$$C:rac{x^2}{a^2}+rac{y^2}{b^2}=1(a>b>0) \hspace{1cm}A,B$$

$$\frac{\sqrt{2}}{2}$$

$$C: rac{x^2}{a^2} + rac{y^2}{b^2} = 1 (a>0, b>0) \qquad AB \qquad \qquad AB \ C \qquad \qquad AC \qquad k_1 \qquad \qquad BC \qquad \qquad k_2$$

$$k_1k_2=e^2-1$$

e



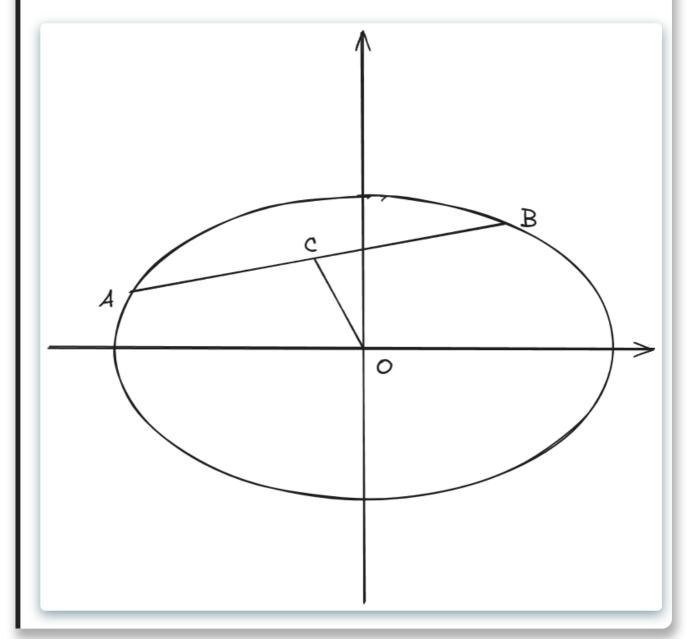
$$k_1k_2=-1$$

$$e = 0$$

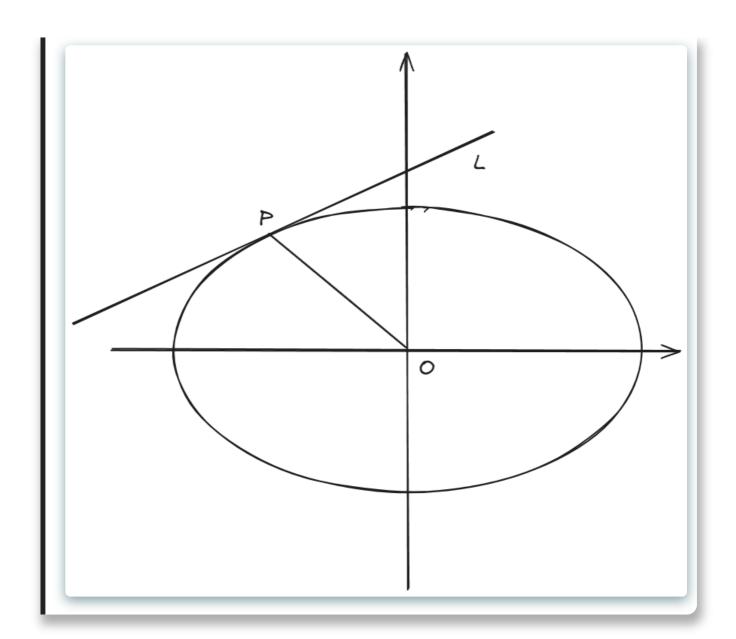
$$k_1k_2 = 0^2 - 1 = -1 \ k_1k_2 = e^2 - 1$$

$$C: rac{x^2}{a^2} + rac{y^2}{b^2} = 1 (a > 0, b > 0) \hspace{1cm} O \hspace{1cm} AB \hspace{1cm} C \ AB \hspace{1cm} k_1 \hspace{1cm} OC \hspace{1cm} k_2$$

$$k_1 k_2 = e^2 - 1$$



$$C:rac{x^2}{a^2}+rac{y^2}{b^2}=1(a>0,b>0) \qquad \qquad \qquad l \ P \qquad OP \qquad k_1 \qquad \qquad l \qquad \qquad k_2 \ \qquad \qquad \qquad \qquad k_1k_2=e^2-1$$



$$e = rac{\sqrt{2}}{2}$$

$$-rac{1}{2} imes 1=e^2-1$$

$$C:rac{x^2}{2}+y^2=1 \ OAB$$

$$l \hspace{1cm} x \hspace{1cm} y \hspace{1cm} A, B \hspace{1cm} O$$

$$\sqrt{2}$$

$$C:rac{x^2}{a^2}+rac{y^2}{b^2}=1(a,b>0) \qquad P(x_0,y_0) \ l:rac{x_0x}{a^2}+rac{y_0y}{b^2}=1 \qquad P \quad l \quad C \qquad l \quad P \quad C$$

1

2.

3.

$$rac{x_0x}{2} + y_0y = 1 \hspace{1.5cm} (x_0,y_0) \ (rac{2}{x_0},0), (0,rac{1}{y_0})$$

$$S = \frac{1}{x_0 y_0}$$

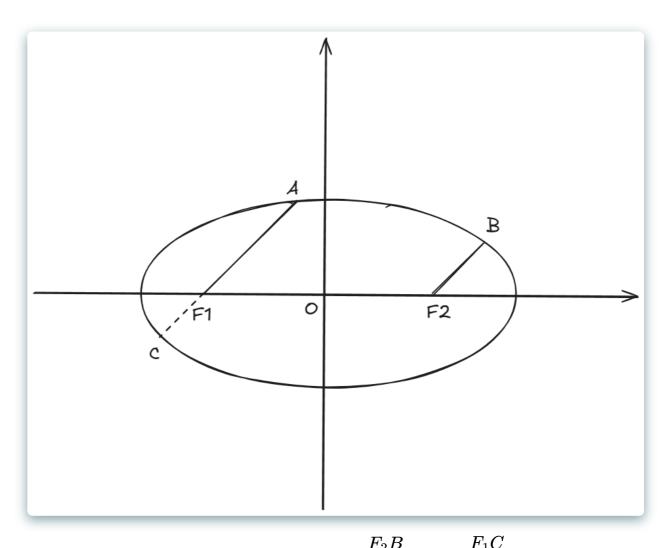
 (x_0,y_0)

$$rac{x_0^2}{2} + y_0^2 = 1 \geq \sqrt{2} x_0 y_0$$

$$x_0y_0 \leq rac{\sqrt{2}}{2}$$
 $S \geq \sqrt{2}$

$$F_1,F_2 \qquad \qquad rac{x^2}{3}+y^2=1 \qquad \qquad A,B \ H_2 \stackrel{}{\overrightarrow{F_1A}}=5F_2B \qquad \qquad A \qquad \qquad _$$

 $(0,\pm 1)$



$$F_2B$$
 F_1C F_1 $(-\sqrt{2},0)$ F_1 $y=k(x+\sqrt{2})$

$$\left\{ egin{aligned} y &= k(x+\sqrt{2}) \ rac{x^2}{3} + y^2 &= 1 \end{aligned}
ight.$$

$$(1+3k^2)x^2+6\sqrt{2}k^2x+6k^2-3=0 \ x_1+x_2=-rac{6\sqrt{2}k^2}{1+3k^2} \quad x_1x_2=rac{6k^2-3}{1+3k^2} \qquad \overrightarrow{F_1A}=5\overrightarrow{F_2B} \ x_1+5x_2=-6\sqrt{2} \quad y_1+5y_2=0 \qquad x_1=0 \ A \qquad (0,\pm 1)$$

$$\left\{egin{array}{c} rac{x_1^2}{3}+y_1^2=1 & (1) \ rac{x_2^2}{3}+y_2^2=1 & (2) \end{array}
ight.$$

$$rac{rac{y_1+y_2}{2}}{rac{x_1+x_2}{2}} \cdot rac{y_1-y_2}{x_1-x_2} = -rac{1}{3}$$

$$F_1$$
 AC AC $\left(rac{x_1+5x_2}{6},rac{y_1+5y_2}{6}
ight)$

$$\left\{ egin{array}{c} rac{x_1^2}{3} + y_1^2 = 1 & (3) \ rac{(5x_2)^2}{3} + (5y_2)^2 = 25 & (4) \end{array}
ight.$$

$$rac{(x_1-5x_2)(x_1+5x_2)}{3}+(y_1-5y_2)(y_1+5y_2)=-24$$

$$F_1 \qquad (rac{x_1+5x_2}{6},rac{y_1+5y_2}{6}) \ (-c,0) \qquad (-\sqrt{2},0) \qquad x_1+5x_2=-6\sqrt{2},y_1+5y_2=0$$

$$x_1-5x_2=6\sqrt{2}$$
 $x_1+5x_2=-6\sqrt{2}$ $x_1=0$ A $(0,\pm 1)$

$$rac{x^2}{a^2}+rac{y^2}{b^2}=1 \hspace{1cm} F_1,F_2 \hspace{1cm} A(x_0,y_0) \ ert AF_1ert = a+ex_1 \ ert AF_2ert = a-ex_2$$

$$|AF_1| = \sqrt{3} + rac{\sqrt{6}}{3}x_1$$
 $|CF_1| = \sqrt{3} + rac{\sqrt{6}}{3}x_2$

$$|AF_1|=5|CF_1| \qquad \sqrt{3}+rac{\sqrt{6}}{3}x_1=5\sqrt{3}+rac{5\sqrt{6}}{3}x_2 \ x_1-5x_2=6\sqrt{2} \qquad x_1+5x_2=-6\sqrt{2} \qquad x_1=0$$

$$x^2 + y^2 = r^2$$

$$x = r \sin heta \ y = r \cos heta$$
 $x = r \sin heta \ y = r \cos heta$
 $x = r \sin heta \ y = r \cos heta$

$$l: ax + by + c = 0$$

$$egin{cases} x = r \sin heta + x_0 \ y = r \cos heta + y_0 \end{cases} \ (x_0, y_0) \qquad O' \qquad r \qquad P \qquad O' \ heta \qquad x \end{cases}$$

$$(x_0,y_0) \ F_1(-\sqrt{2},0) \ AC$$

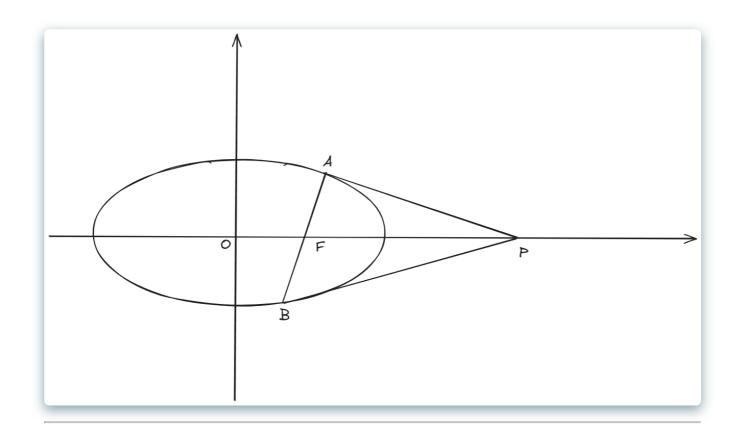
$$\left\{ egin{aligned} x &= r\sin heta - \sqrt{2} \ y &= r\cos heta \end{aligned}
ight.$$

$$egin{split} rac{(r\sin heta-\sqrt{2})^2}{3}+(r\cos heta)^2=1\ (1+2{\cos}^2 heta)\cdot r^2-2\sqrt{2}\sin heta\cdot r-1=0 \end{split}$$

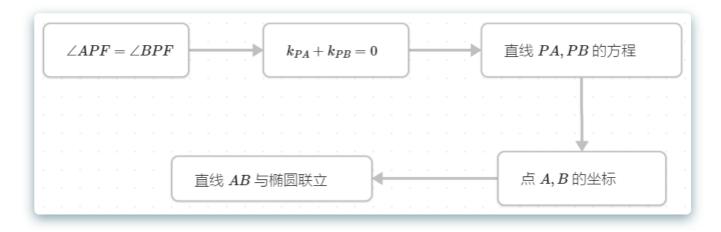
$$egin{aligned} C:rac{x^2}{4}+rac{y^2}{3}&=1 & F & l & P_i(x_i,y_i)(i=1,2) \ y_1>y_2 & \overrightarrow{P_1F}&=2\overrightarrow{FP_2} & l & |P_1P_2| \end{aligned}$$

$$l:y=-rac{\sqrt{5}}{2}(x-1)$$
 $|P_1P_2|=rac{\sqrt{5}}{2}$

$$\Gamma:rac{x^2}{4}+rac{y^2}{3}=1$$
 Γ F P $(4,0)$ F AB Γ A,B $\angle APF=\angle BPF$

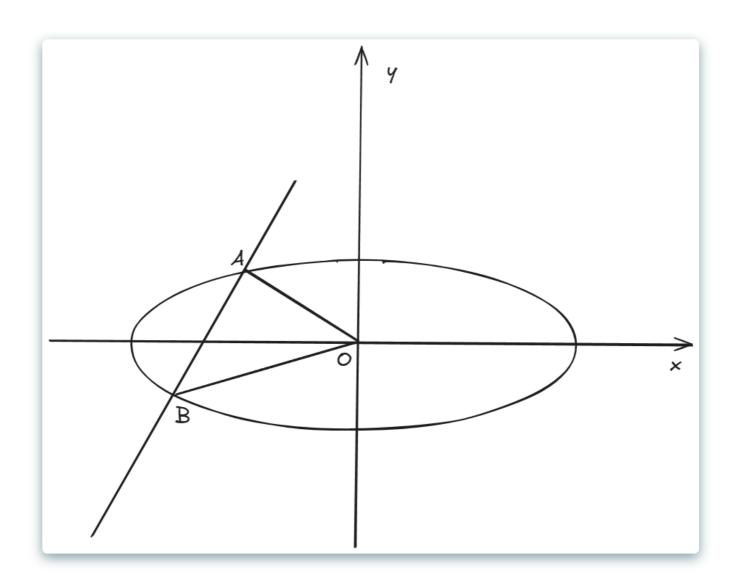


$$egin{array}{lll} \angle APF, \angle BPF & & & & & & \\ \angle APF = \angle BPF & & & & & & \\ PA, PB & & & & P & & & \\ & & & A, B & & F & & & & \\ & & & & & A, B & \\ & & & & & & A, B & \\ & & & & & & A, B & \\ \end{array}$$



$$egin{array}{cccc} \Gamma:rac{x^2}{a^2}+rac{y^2}{b^2}=1(a,b>0) & l & \Gamma \ O & OAB & S_{OAB} \end{array}$$

 $\frac{ab}{2}$



 $x \qquad a > b$

$$AB$$
 $y=kx+m$
$$S_{OAB}=rac{ab|m|\sqrt{a^2k^2+b^2-m^2}}{a^2k^2+b^2}$$

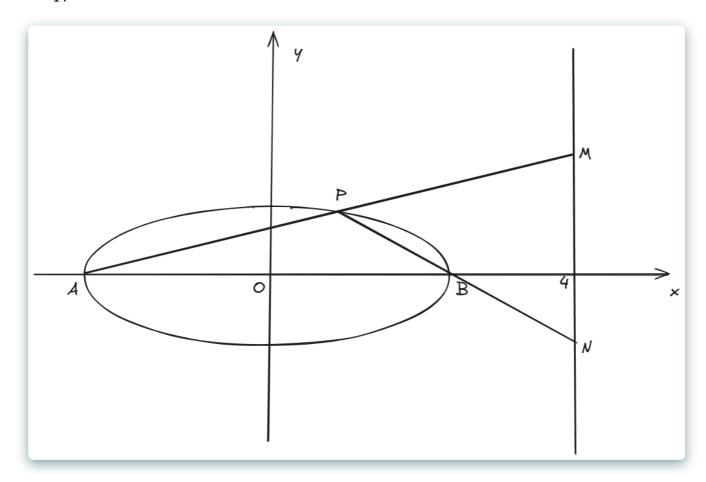
$$egin{split} S_{OAB} & \leq rac{abrac{m^2+a^2k^2+b^2-m^2}{2}}{a^2k^2+b^2} \ & = rac{ab}{2} \end{split}$$

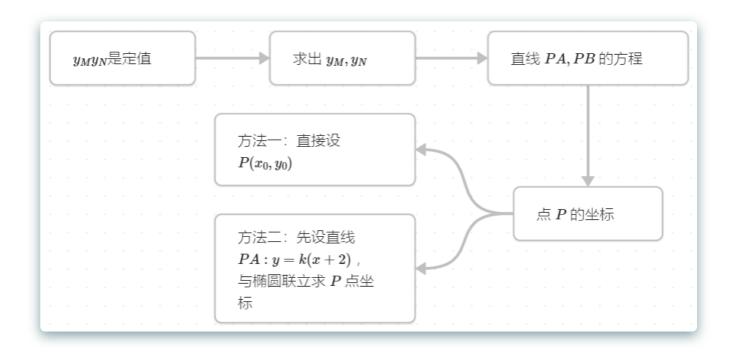
$$|m| = \sqrt{a^2 k^2 + b^2 - m^2}$$

 S_{OAB}

$$egin{align} y &= kx + m &= \sqrt{k^2 + 1} |x_1 - x_2| = \sqrt{(rac{1}{k^2})^2 + 1} |y_1 - y_2| \ &= my + t &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |y_1 - y_2| = \sqrt{(rac{1}{m})^2 + 1} |x_1 - x_2| \ &= \sqrt{m^2 + 1} |x_1 - x_2| \ &= \sqrt{m^$$

$$\Gamma:rac{x^2}{4}+rac{y^2}{3}=1 \hspace{1cm} A \hspace{1cm} B \hspace{1cm} P \hspace{1cm} \Gamma \ A \hspace{1cm} B \hspace{1cm} PA \hspace{1cm} PB \hspace{1cm} x=4 \hspace{1cm} M \hspace{1cm} N \hspace{1cm} M$$



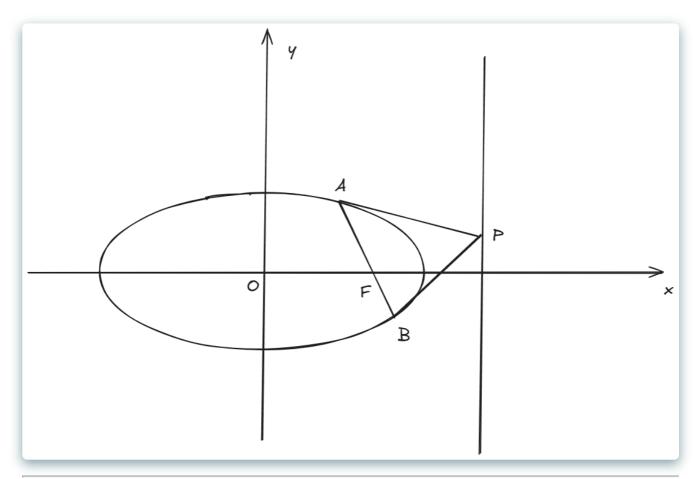


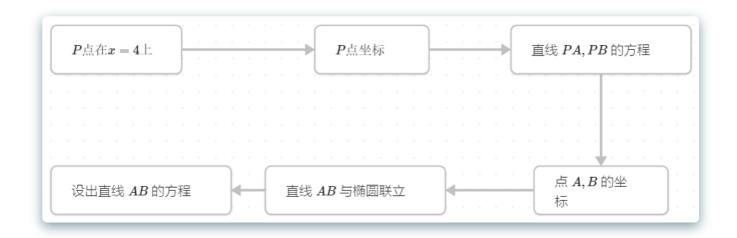
$$AB$$
 $k_{PA}k_{PB}=e^2-1=-rac{3}{4}$ PA $y=k(x+2)$ PB $y=-rac{3}{4k}(x-2)$ M,N $(4,6k),(4,-rac{3}{2k})$ -9

P

$$\Gamma:rac{x^2}{4}+rac{y^2}{3}=1 \qquad \qquad F \qquad F \qquad \Gamma \qquad A,B \ \Gamma \quad A,B \qquad \qquad P \ \qquad P \qquad \qquad x=4 \ PA\perp PB$$

$$PF \perp AB$$

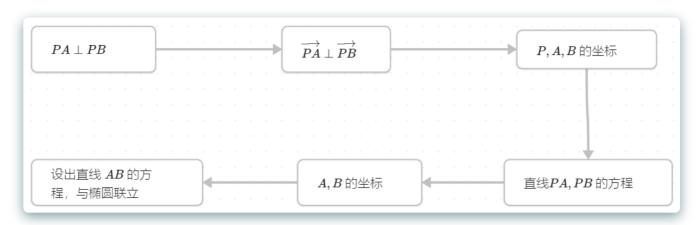




P 4 P (m,n)

 $\overrightarrow{PA} \perp \overrightarrow{PB}$

m=4



P, A, B