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$$\sqrt{{}^nC_1}+\sqrt{{}^nC_2}+\dots\sqrt{{}^nC_n} \le \left(n\left({}^nC_1+{}^nC_2+\dots{}^nC_n\right)\right)^{1/2}$$

$$\sqrt{\frac{\left(\sqrt{{}^nC_1}\right)^2+\left(\sqrt{{}^nC_2}\right)^2+\dots\left(\sqrt{{}^nC_n}\right)^2}{n}} \ge \frac{\sqrt{{}^nC_1}+\sqrt{{}^nC_2}+\dots+\sqrt{{}^nC_n}}{n}$$

$y=x^2$

$\left(\sqrt{{}^nC_1},\ {}^nC_1\right)$

$\left(\sqrt{{}^nC_2},\ {}^nC_2\right)$

$\left(\sqrt{{}^nC_3},\ {}^nC_3\right)$

$$\left(\frac{\sum\sqrt{{}^nC_r}}{n},\ \frac{\sum {}^nC_r}{n}\right)$$

$$\left(\frac{\sum\sqrt{{}^nC_r}}{n},\ \left(\frac{\sum\sqrt{{}^nC_r}}{n}\right)^2\right)$$

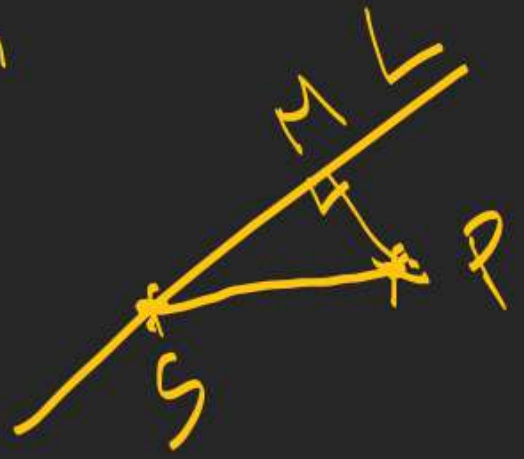
$$\left(\sqrt{{}^nC_1}\cdot 1+\sqrt{{}^nC_2}\cdot 1+\dots\right)^2 \le \left({}^nC_1+{}^nC_2+\dots{}^nC_n\right)\left(1^2+1^2+\dots 1^2\right)n$$

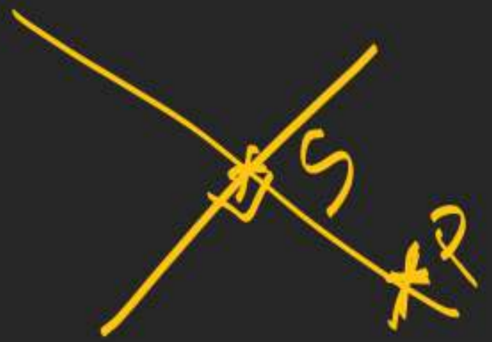
$$\frac{\sum_{r=1}^{n}{}^nC_r}{n} \ge \left(\frac{\sum_{r=1}^{n}\sqrt{{}^nC_r}}{n}\right)^2$$

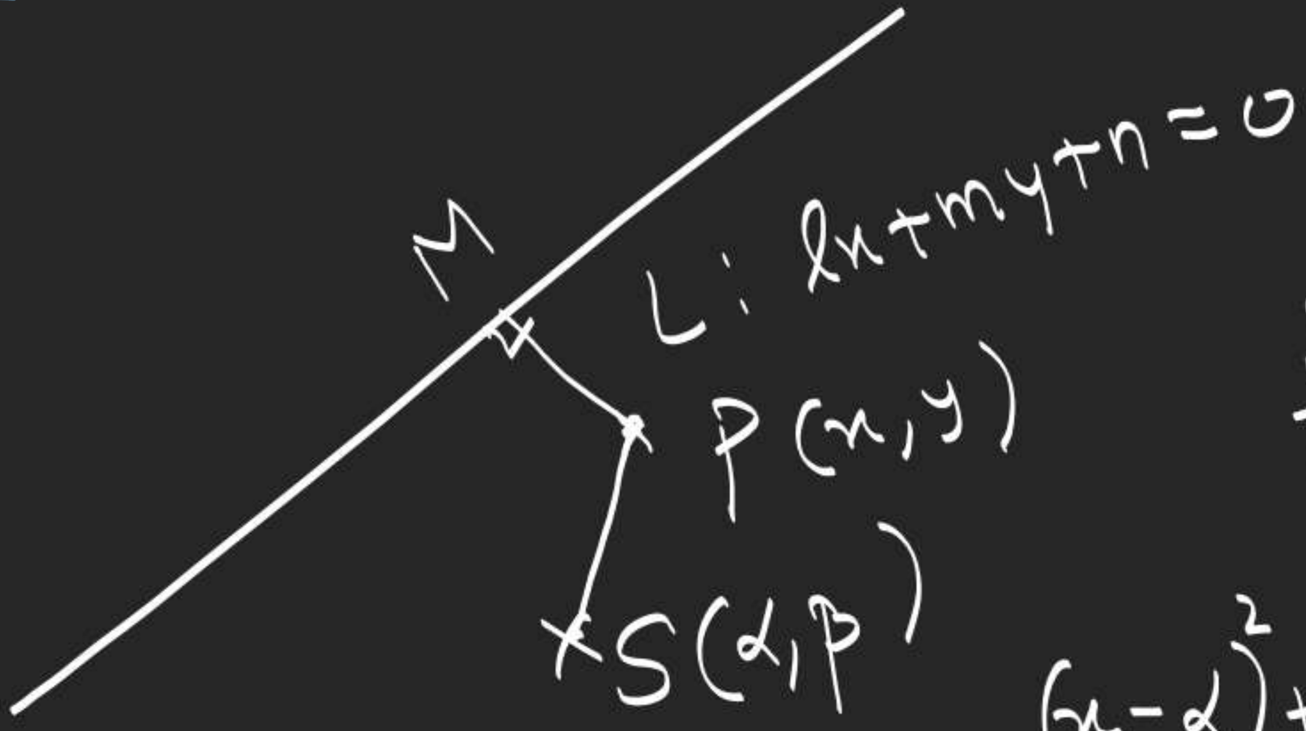
Focus lies on directrix

conic become pair of lines passing thru focus.

- $e > 1$: 2 distinct real lines
- $e = 1$: 2 coincident lines.
- $0 < e < 1$: imaginary lines.







$$\frac{PS}{PM} = e$$

$$(x-\alpha)^2+(y-\beta)^2 = e^2\left(\frac{(lx+my+n)}{l^2+m^2}\right)$$

$$h^2-ab = (-lme^2)^2-(l^2+m^2-e^2l^2)(l^2+m^2-e^2m^2)$$

$$= -(l^2+m^2)^2+(l^2+m^2)^2e^2$$

$$= (l^2+m^2)^2(e^2-1)$$

$$x^2(l^2+m^2-e^2l^2)+y^2(l^2+m^2-m^2e^2)-2lme^2xy$$

$$-(2\alpha(l^2+m^2)+2lne^2)x-(2\beta(l^2+m^2)+2mne^2)y$$

$$+(\alpha^2+\beta^2)(l^2+m^2)-n^2e^2=0$$

General form $\Downarrow$

$$\boxed{ax^2+by^2+2hxy+2gx+2fy+c=0}$$

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$ax^2+2hxy+by^2+2gx+2fy+c=0$

$\Delta = abc+2fgh-af^2-bg^2-ch^2$

Parabola

$\Delta \neq 0$, $e=1$,

$h^2=ab$

Ellipse

$\Delta \neq 0$, $0<e<1$

$h^2<ab$

Hyperbola

$\Delta \neq 0$, $e>1$

$h^2>ab$

Circle

$a=b$, $h=0$

St. Line

Circle

Parabola

Ellipse

Hyperbola

SOT

Vector + 3D

Complex No.

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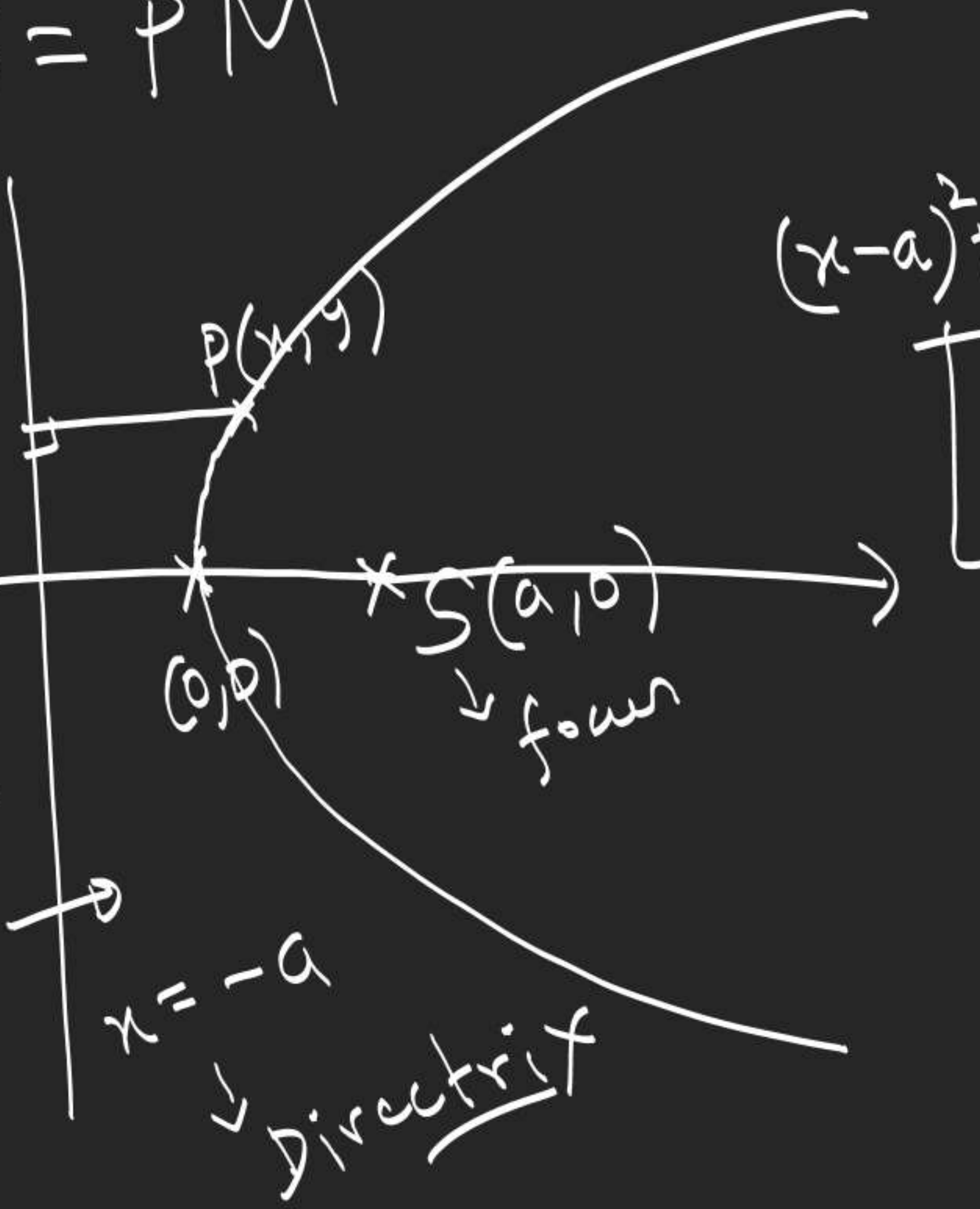
Parabola

$PS = PM$



Axis :-

Vertex :-

Double Ordinate

Latus Rectum →

$$(x-a)^2 + y^2 = |x+a|^2$$

$$\boxed{y^2 = 4ax}$$

$$y = \pm\sqrt{4ax}$$

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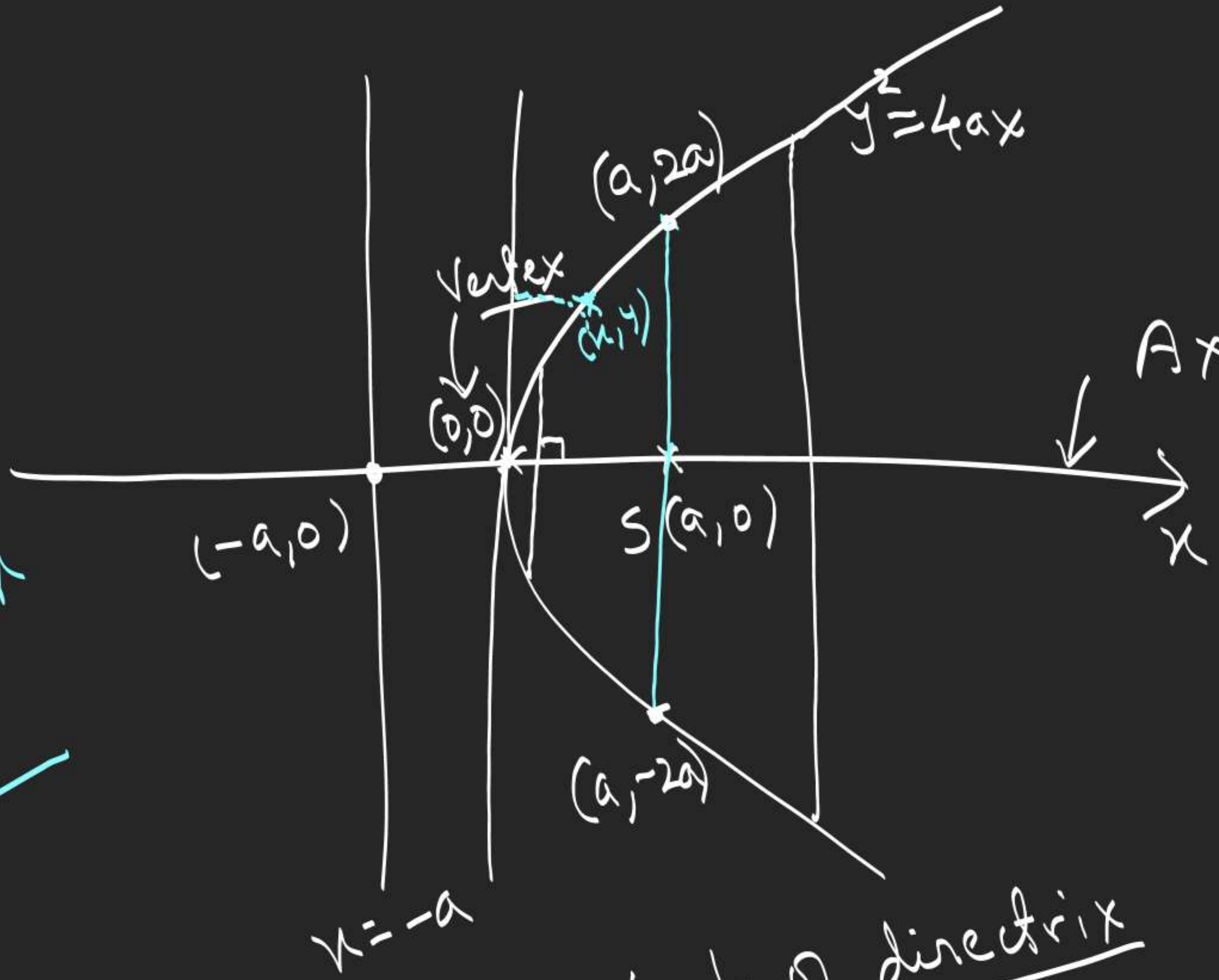

foot of directrix

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Eqn. of Parabola

$$\boxed{\left(\perp\text{ar distance of any point 'P' on parabola from its axis}\right)^2 = \left(\text{Length of Latus Rectum}\right)\left(\perp\text{ar distance of 'P' from tangent at vertex}\right)}$$

$\boxed{\text{Ex-3} \to \text{PT-1}}$

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