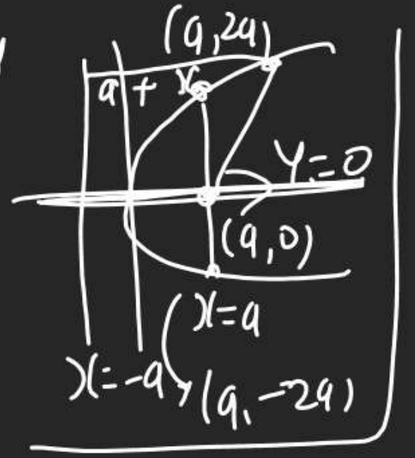
Nishant Jindal

Q for $y^2 = 12x$ find terms Associated with it

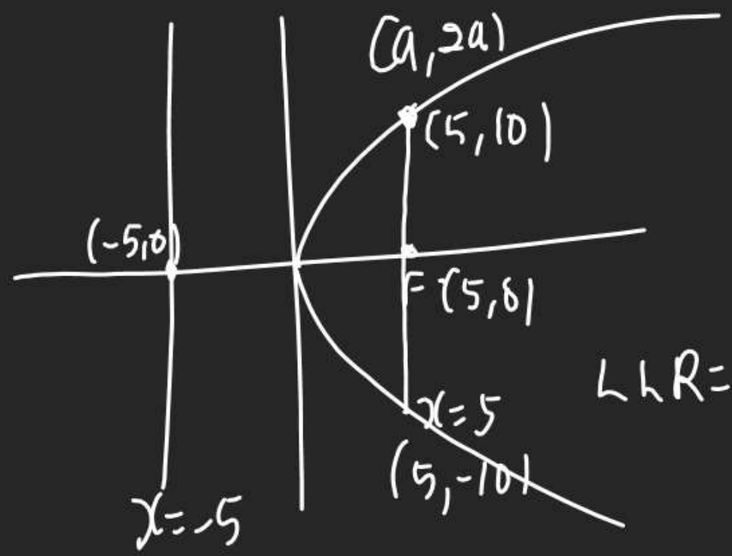
$y^2 = 4ax \Rightarrow a = 3$

Eqn	$y^2 = 12x$	
Focus	$(a,0)$	$\equiv (3,0)$
Axis	$y=0$	$y=0$
Directrix	$x=-a$	$x=-3$
Eqn of LR	$x=a$	$x=3$
EndPts LR	$(a,2a)$ $(a,-2a)$	$(3,6)$ $(3,-6)$
LLR	$4a$	$4\times3=12$
Focal dist.	$x+a$	$x+3$



Q2 If vertex of Parabola is at origin & dir. be $x+5=0$ then length of LR = ?

dir $\rightarrow x+5=0 \Rightarrow x=-5$



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Q3 Find Terminologies of Par.

of $y^2-4x-2y-7=0$.

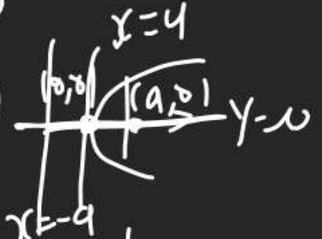
$y^2-2y+1 = 4x+7+1$

$(y-1)^2 = 4x+8$

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

$Y^2 = 4X$

$a=1$



Vertex	$X=0, Y=0$	$x+2=0$, $y-1=0$ $\Rightarrow (x,y) \equiv (-2,1)$
Directrix	$X=-a$	$x+2=-1 \Rightarrow \boxed{x=-3}$
Axis	$Y=0$	$y-1=0 \Rightarrow \boxed{y=1}$
Focus	$X=a, Y=0$	$x+2=1$ & $y-1=0 \Rightarrow (x,y) \equiv (-1,1)$
LR	$X=a$	$x+2=1 \Rightarrow \boxed{x=-1}$

Q4 If $y^2+2y-x+5=0$ is Par.

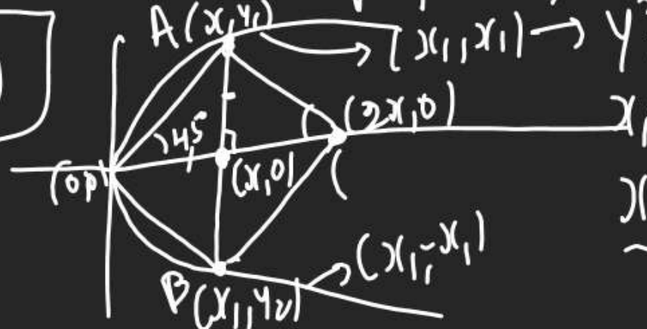
HW find Vertex, Axis, Focus, Dir, LR, LLR, Ends

(-4,-1) $Y=-1$ $(\frac{17}{4},-1)$ $Y=\frac{15}{4}$ (1)

"HBD Utkrisht"

Q5 A Sqr has one Vertex at vertex of Par. $Y^2 \equiv 16X$ & diagonal thru the vertex lies along axes of Parabola. If ends of other diagonal lie on Parabola, the coordinates of vertices of sqr are?

$(\frac{17}{4},\frac{1}{2})$ & $(\frac{17}{4},\frac{-1}{2})$



$Y^2 = 16X$

$x_1^2 = 16x_1$

$x_1 = 0, y_1 = 16$ ✗

A = (16,16)

B = (16,-16)

(32,0)

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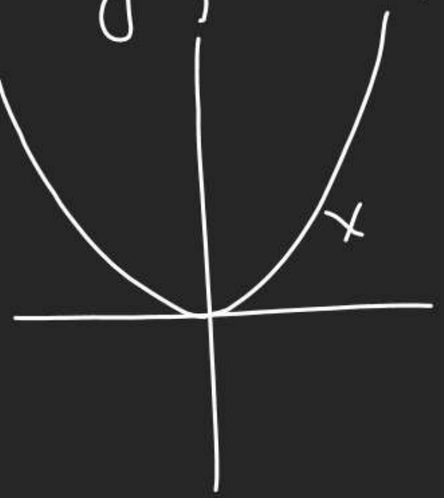
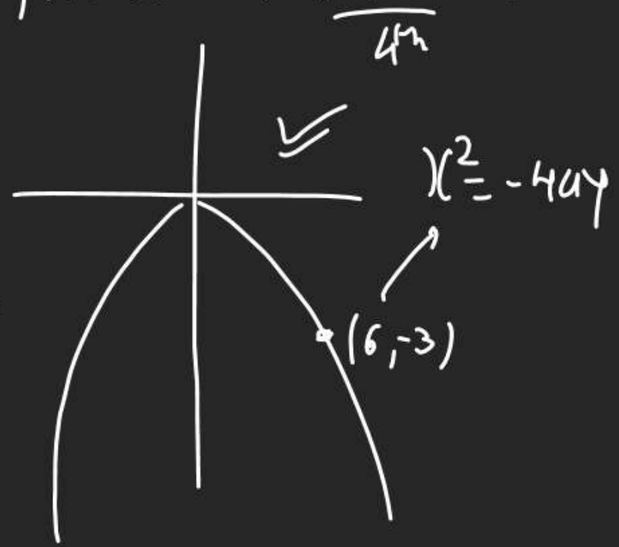
Q Eqn of Par. with its Vertex at origin, axis on y Axis & P.T. (6, -3) is?





$36 = +4a(x+3)$

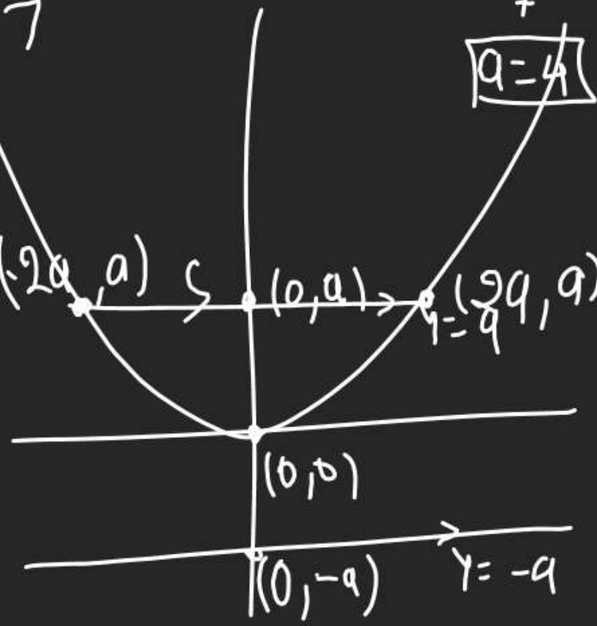
$a = 3$

$\therefore$ Par $\rightarrow x^2 = -12y$

Q For Parabola $x^2 = 16y$ find terminologies?

$4ay$

$a = 4$



Vertex (0, 0)

Focus $(0, a) = (0, 4)$

Directrix $\rightarrow y = -a \Rightarrow y = -4$

F.D $\Rightarrow$ (0, -4)

Axis $\rightarrow x = 0$

LR $\rightarrow y = a \Rightarrow y = 4$

LR = 16

End Pts

$(2a, a) = (8, 4)$

& $(-2a, a) = (-8, 4)$

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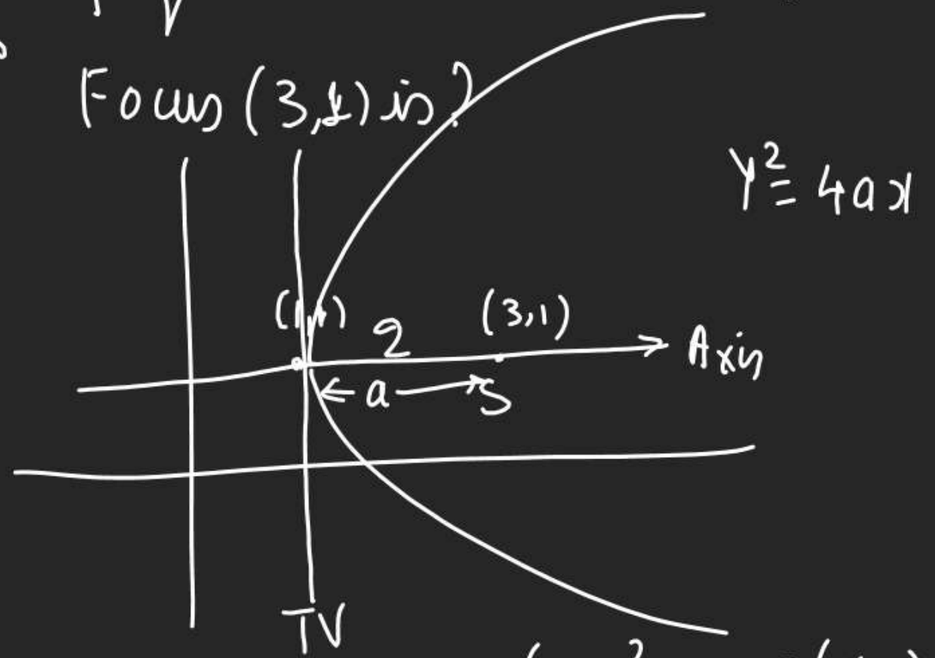
Q Eqn of Parabola with Vertex (1,1) & Focus (3,1) is?



$y^2 = 4ax$

$(y-1)^2 = 4 \times 2 (x-1)$

Q Parabola $(x+9)^2 = -(y-3) \rightarrow x^2 = -4ay$

Vertex $(-9, 3)$ $\quad 4a = 1$, $a = 1/4$

* RK

If vertex shifts to (h, k) then

Parabola will be $(y-k)^2 = 4a(x-h)$

Q Axis of $9y^2 = 16x - 12y - 57 = 0$ → $y = \frac{2}{3}$ Ans.

Q Vertex of $x^2 + 8x + 12y + 4 = 0$ → $V = (-4, 1)$

Q Eqn of Dir. of $y^2 + 4y + 4x + 2 = 0$ → $x = 3/2$

Q Focus of $y^2 = x - 2y + 2 = 0$ → $S = (\frac{5}{4}, 1)$

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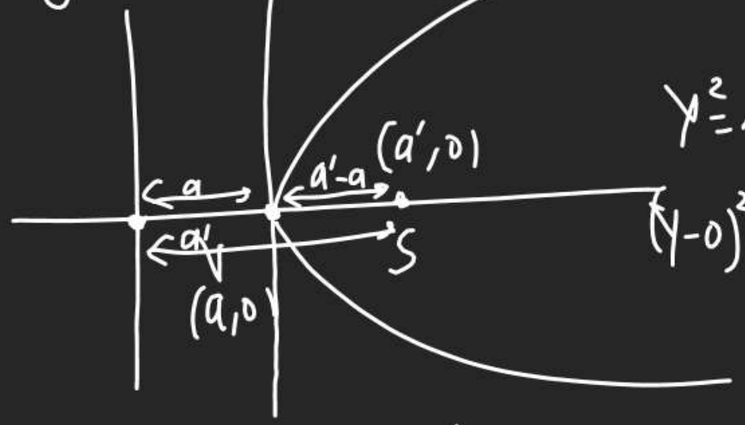
Q10 Eqn of Parabola whose axis is X Axis & Vertex, Focus are at distance a, a' from origin to +ve side.

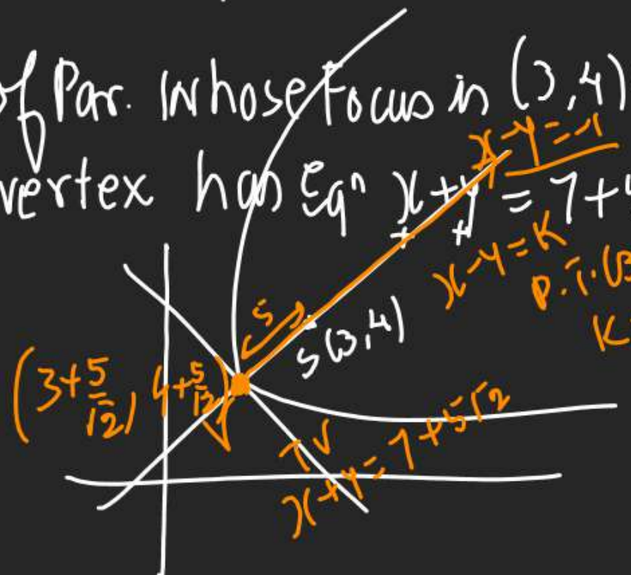


$Y^2 = 4a(X-a)$

$(Y-0)^2 = 4(a'-a)(X-a)$

Q L.L.R of Par. whose Focus is (3,4) & whose tangent at vertex has Eqn $x+y = 7+5\sqrt{2}$ is ?

$= 4a$



① for Vertex solving $x-y=-1$ and $x+y=7+5\sqrt{2}$

$2x = 6+5\sqrt{2}$

$x = 3+\frac{5}{12}$

$-2y = -8-5\sqrt{2}$

$y = (5+\frac{5}{\sqrt{2}})$

(2) a = dist. bet S & V

$\sqrt{(3+\frac{5}{12}-3)^2+(4+\frac{5}{12}-4)^2}$

$= \sqrt{\frac{25}{2}+\frac{25}{2}} = 5$

(3) LLR = 4a = 5×4 = 20

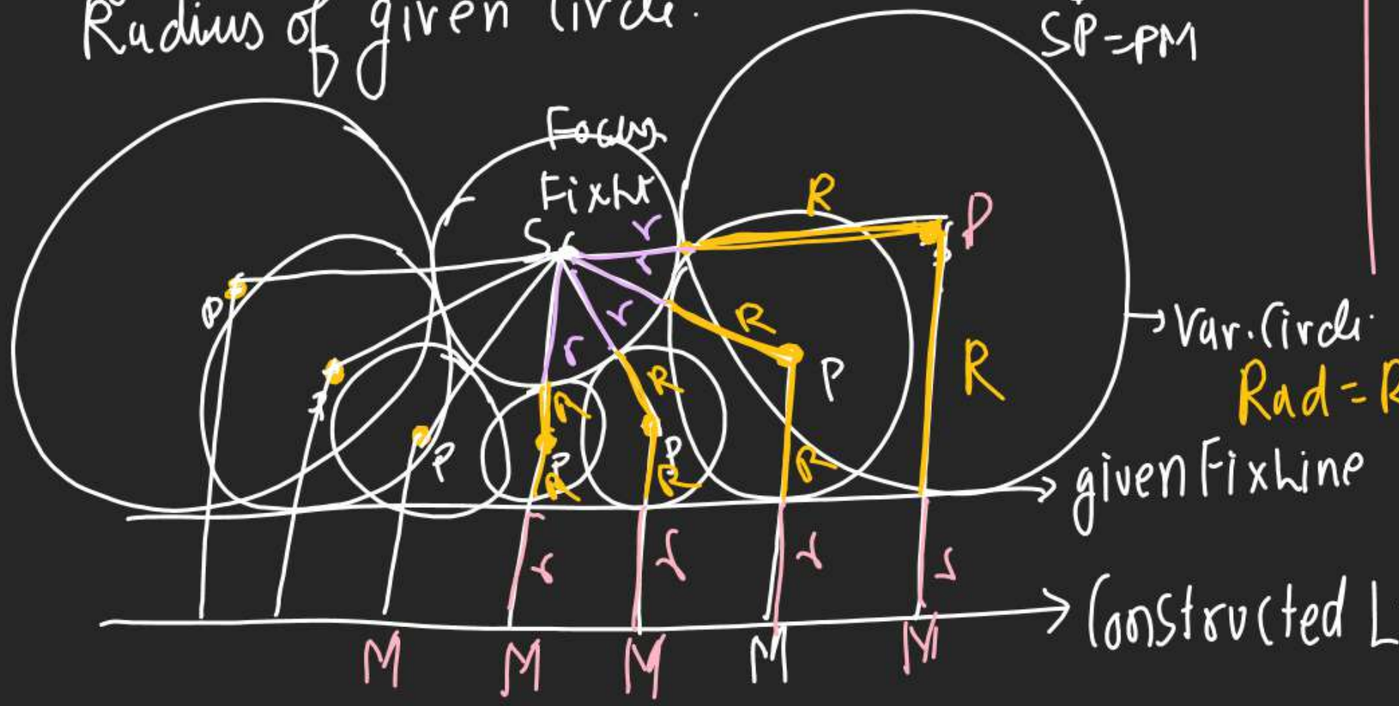
Q12 Dir. of Par. in $x+y=2$. If its Focus is origin, then LLR of Par? → $2\sqrt{2}$

$2a = \frac{|2|}{\sqrt{2}} = \sqrt{2}$

LLR = 4a = $2\sqrt{2}$

Q If a Var. Circle touches a fix Circle & a fix Line then P.T. the Locus of the Centre of variable Circle is a Parabola whose directrix is ||^{el} to a given Line at a distance eq^{l} to Radius of given Circle.

} Locus of Centre of Var. Circle Par. Proved ↓ SP = PM



as SP = PM can be done ⇒ Locus of Centre of var. Circle will be Parabola

SP = R + r

here PM must be R + r ⇒ Constructed ||^{el} line to given line must be at distance of r.

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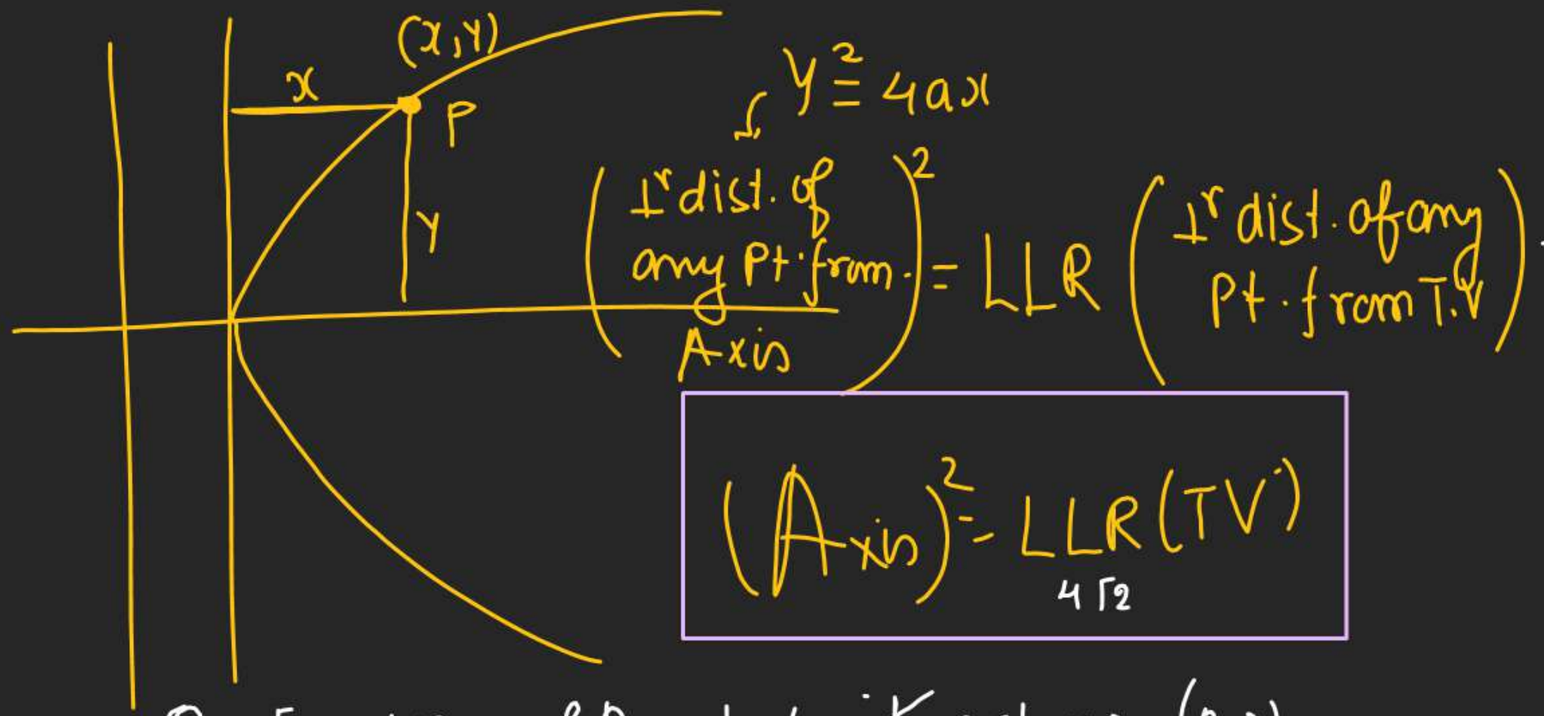
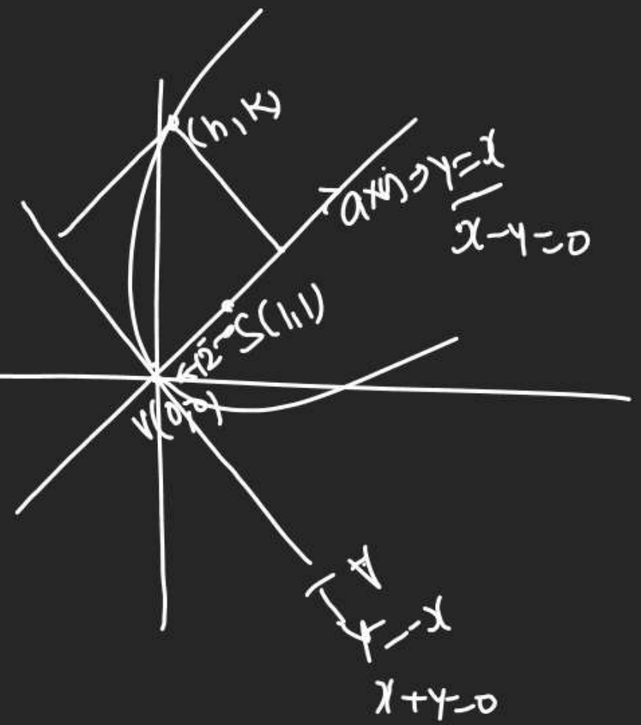
TEDA hai Par abola mera hai



$\therefore y^2 = 4ax$

$$\left(\begin{matrix}1^{r}\text{ dist. of}\\ \text{any Pt. from}\\ \text{Axis}\end{matrix}\right)^2 = LLR\left(\begin{matrix}1^{r}\text{ dist. of any}\\ \text{Pt. from T.V}\end{matrix}\right)$$

$$(A_{xis})^2 = LLR_{4\sqrt{2}}(TV')$$

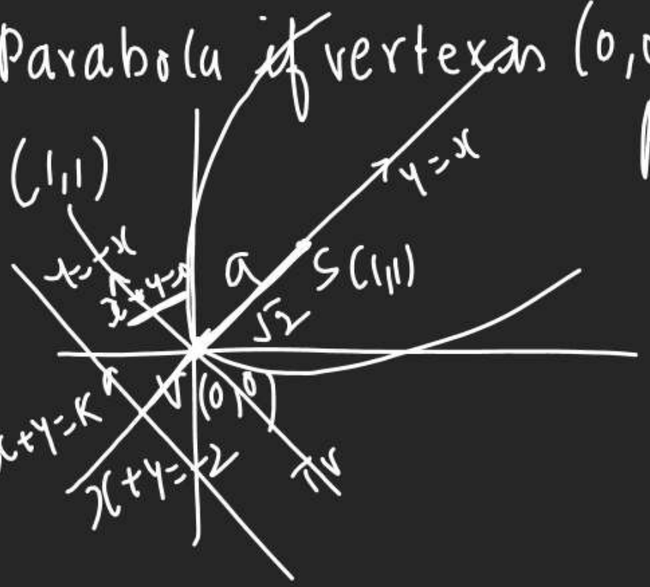


$$\left(\frac{h-k}{\sqrt{2}}\right)^2 = 4\sqrt{2}\left(\frac{h+k}{\sqrt{2}}\right)$$

$$(x-y)^2 = 8(x+y)$$

Par.

Q 14 Find Eqn of Parabola if vertex is (0,0) & Focus is (1,1)



Axis → $x+y=-2$

T.V → $x+y=0$

LLR = $4\sqrt{2}$

① Axis

$$\frac{|-k|}{\sqrt{2}} = \sqrt{2}$$

$k = 2, -2$

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Q 15 Find LLR, TV & Axis

(Axis)^2 = LLR CTV

for $(3x+4y-4)^2 = 4(4x-3y+1)$

+ve distance in Convert

$$\left(\frac{3x+4y-4}{5}\right)^2 = \frac{4}{5}\left(\frac{4x-3y+1}{5}\right)$$

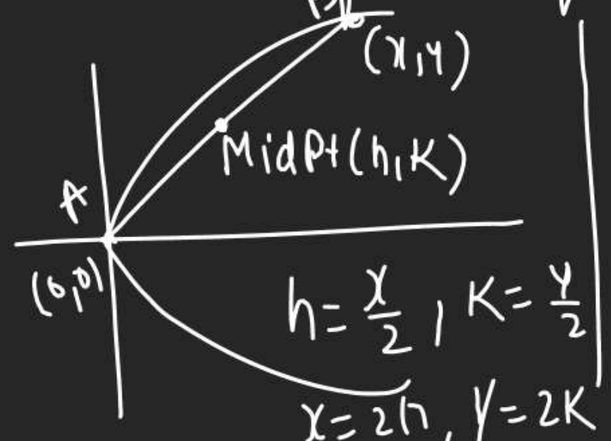
Axis $\Rightarrow 3x+4y-4=0$

T.V $\Rightarrow 4x-3y+1=0$

LLR $= \frac{4}{5}$

Q 16 If 2 vertex of Chord of Par. $y^2 = 4ax$ is $(0,0)$

find Locus of Mid Pt of chord.



(x,y) on Parabola $y^2 = 4ax$

$(2K)^2 = 4a(2h)$

Locus $y^2 = 2ax$

is also Par.

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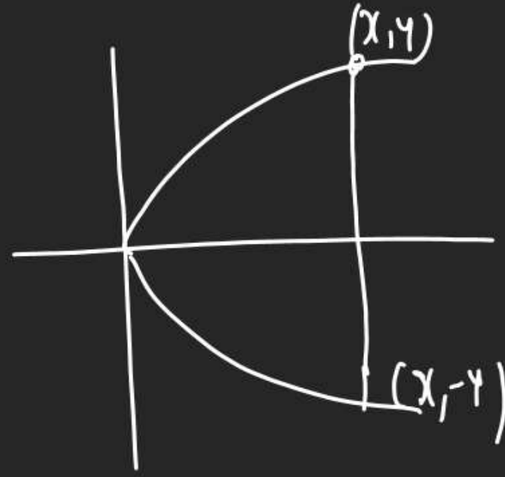
Q Find Locus of Pt. which divides D.O. in Ratio 2:3 for $y^2 = 4ax$?



A. $25y^2 = 4ax$

Q Focal chord of $y^2 = 4ax$ makes θ angle with +ve dir. of x axis then find the $\perp^r$ dist. of chord from origin

$d = a \sin\theta$

Q One vertex of chord of Par. is (0,0) If chord makes angle θ with x Axis in +ve dir find length of chord

$4a \operatorname{Cosec}\theta \cot\theta$

Q Find Sides of eq$^{\Delta}$ in $y^2 = 4ax$, if one of its vertex (coincides with vertex of Parabola.

$\left(\frac{A}{2}\right)^2 = 4a\frac{\sqrt{3}A}{2}$

$A = 8\sqrt{3}a$