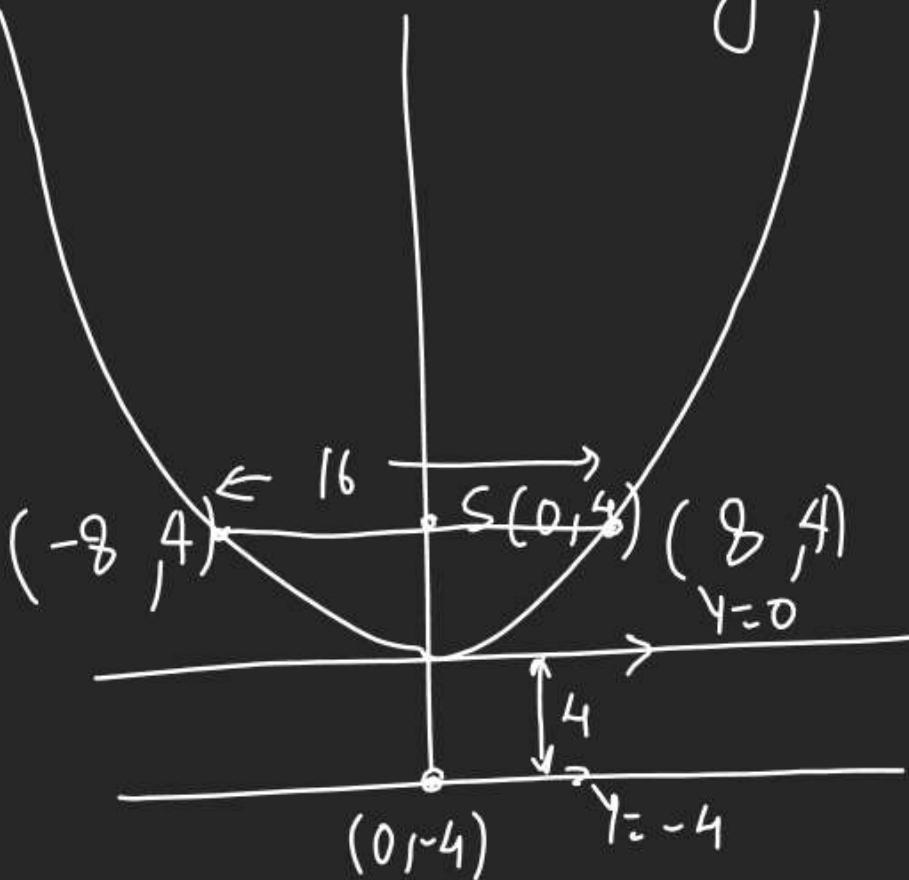


Q find all terms for  $x^2 - 16y$

$$\textcircled{1} \quad x^2 = 16y$$

$$x^2 = 4ay \Rightarrow a = 4$$

Opening to +ve y Axis



$$\textcircled{1} \quad A_{\text{Axis}} \Rightarrow x=0$$

$$\textcircled{2} \quad D_{\text{irr}} \Rightarrow y = -4$$

$$\textcircled{3} \quad T_{\text{irr}} \Rightarrow y = 0$$

$$\textcircled{4} \quad \text{Focus } S = (0, 4)$$

$$y = 4 \text{ when } (5) \text{ F.D.} \Rightarrow (0, -4)$$

$$x^2 = 16y \quad (6) \quad L.R. \Rightarrow (8, 4), (-8, 4)$$

$$x^2 = 16 \times 4 \quad (7) \quad L.L.R. \Rightarrow 16$$

$$x = \pm 8$$

	$(X=0)$ $y=0$	$y=0$ $y+1=0$	Ver. $(4, -1)$
(1) Vertex	$(X=0)$ $y=0$	$y=0$ $y+1=0$	$(4, -1)$
(2) Axis	$y=0$ $y+1=0$	$y=-1$	
(3) Directrix	$X = -A$	$X-4 = -\frac{1}{4}$	$X = \frac{15}{4}$
(4) Focus	$X=A, Y=0$	$X-4 = \frac{1}{4}$	$(\frac{17}{4}, 1)$

$$\textcircled{1} \quad \text{If } y^2 + 2y - 1 + 5 = 0 \text{ Reb. Parabola}$$

Find its vertex, axis of symm

Focus, Eqn of Dir; LLR, LR?

$$y^2 + 2y - x + 5 = 0$$

$$\Rightarrow y^2 + 2y + 1 = x - 5 + 1$$

$$\Rightarrow (y+1)^2 = 6(-4) \Rightarrow y^2 = 4Ax$$

$$y = y+1, X = x-4 \quad \& \quad 4A = 1 \\ A = \frac{1}{4}$$

$$(5) \text{LLR} = 1$$

$$(6) \text{LR} \Rightarrow X = A, Y = 2A \\ \Rightarrow y = 1, x-4 = \frac{1}{4}, y = \frac{2}{4} \left\{ \frac{11}{4}, \frac{13}{4} \right\}$$

$$X = -A, Y = -2A$$

$$x-4 = -\frac{1}{4}, y+1 = -\frac{2}{4} \\ \left( \frac{17}{4}, -\frac{3}{2} \right)$$

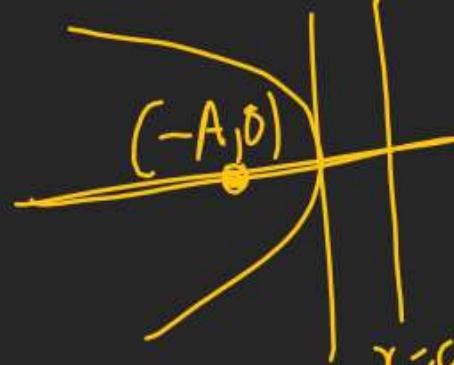
Q L LR for  $4y^2 + 12x - 20y + 17 = 0$

$$4y^2 - 20y = -12x - 17$$

$$4(y^2 - 5y + \frac{25}{4}) = -12x - 17 + 25$$

$$\left(\frac{5}{2}\right)^2 \leftarrow 4\left(y - \frac{5}{2}\right)^2 = -12x + 8$$

$$4\left(y - \frac{5}{2}\right)^2 = -12(x - \frac{2}{3})$$



$$LLR = 4A = 3$$

$$(y - \frac{5}{2})^2 = -3(x - \frac{2}{3})$$

(A) Vertex  $X=0, Y=0$

$$x - \frac{2}{3} = 0, y - \frac{5}{2} = 0 \quad \left\{ \left( \frac{2}{3}, \frac{5}{2} \right) \text{ vertex} \right.$$

(B) Axis  $Y=0 \Rightarrow y - \frac{5}{2} = 0 \Rightarrow y = \frac{5}{2} \text{ or } 2y - 5 = 0$

(C) Directrix  $X = A \Rightarrow x - \frac{2}{3} = \frac{3}{4} \Rightarrow x = \frac{3}{4} + \frac{2}{3} = \frac{17}{12}$   $\overbrace{12x - 17 = 0}$

(D) Focus  $X = -A, Y = 0 \quad \left| \begin{array}{l} x - \frac{2}{3} = -\frac{3}{4} \Rightarrow x = \frac{2}{3} - \frac{3}{4} = \frac{8-9}{12} = -\frac{1}{12} \\ y - \frac{5}{2} = 0 \Rightarrow y = \frac{5}{2} \end{array} \right. \left( -\frac{1}{12}, \frac{5}{2} \right)$

Q Consider Par.

$$x^2 - 4x - 5y - 1 = 0$$

A) Vertex of Para.

B) Focus , "

C) Dir. , "

D) LLL , "

① Vertex  $x=0, y=0$

$$x-2=0, y+1=0 \Rightarrow (2, -1)$$

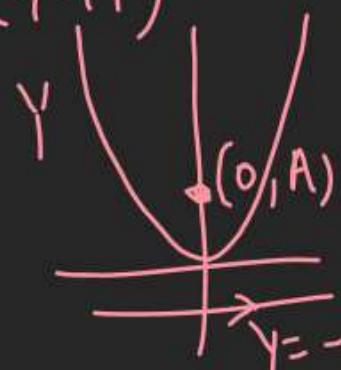
② Focus  $x=0, y=A$

$$x-2=0, y+1=\frac{5}{4} \Rightarrow (2, \frac{1}{4})$$

③ Dir  $y=-A \Rightarrow y+1=-\frac{5}{4} \Rightarrow y=-\frac{9}{4}$

④ LLL  $\Rightarrow 4A=5$

$$\begin{aligned} x^2 - 4x &= 5y + 1 \\ x^2 - 4(x+4) &= 5(y+1)+4 \\ (x-2)^2 &= 5(y+1) \\ x^2 &= 4A y \\ 4A &= 5 \end{aligned}$$



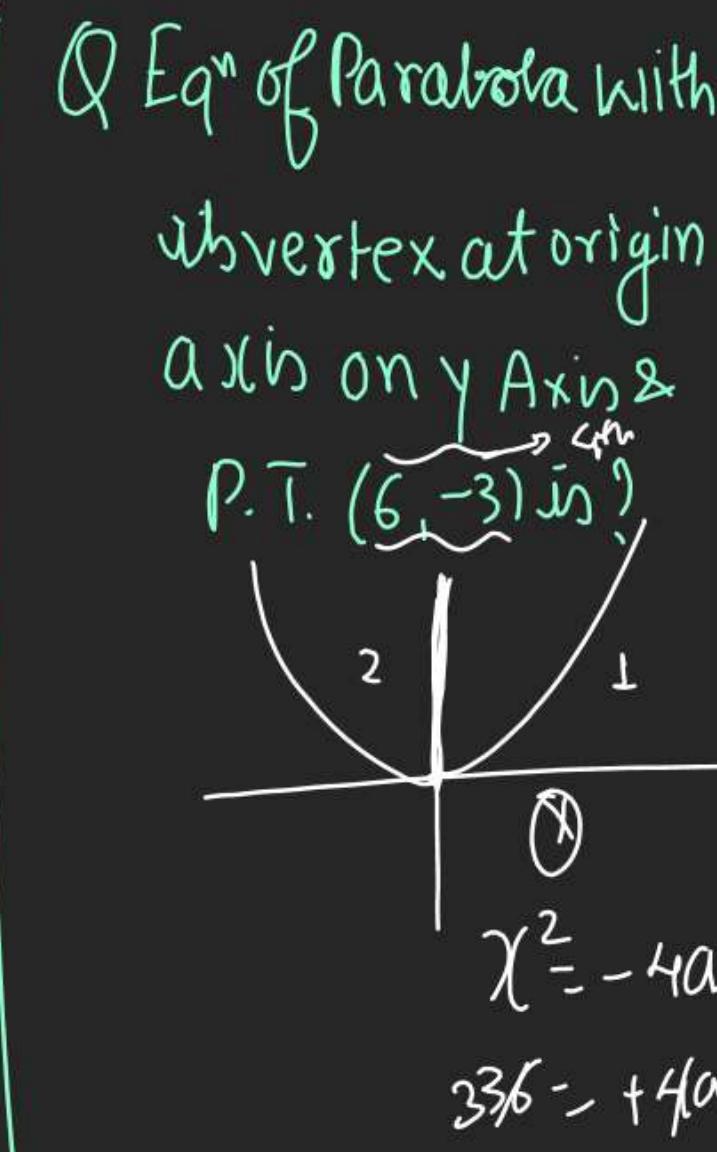
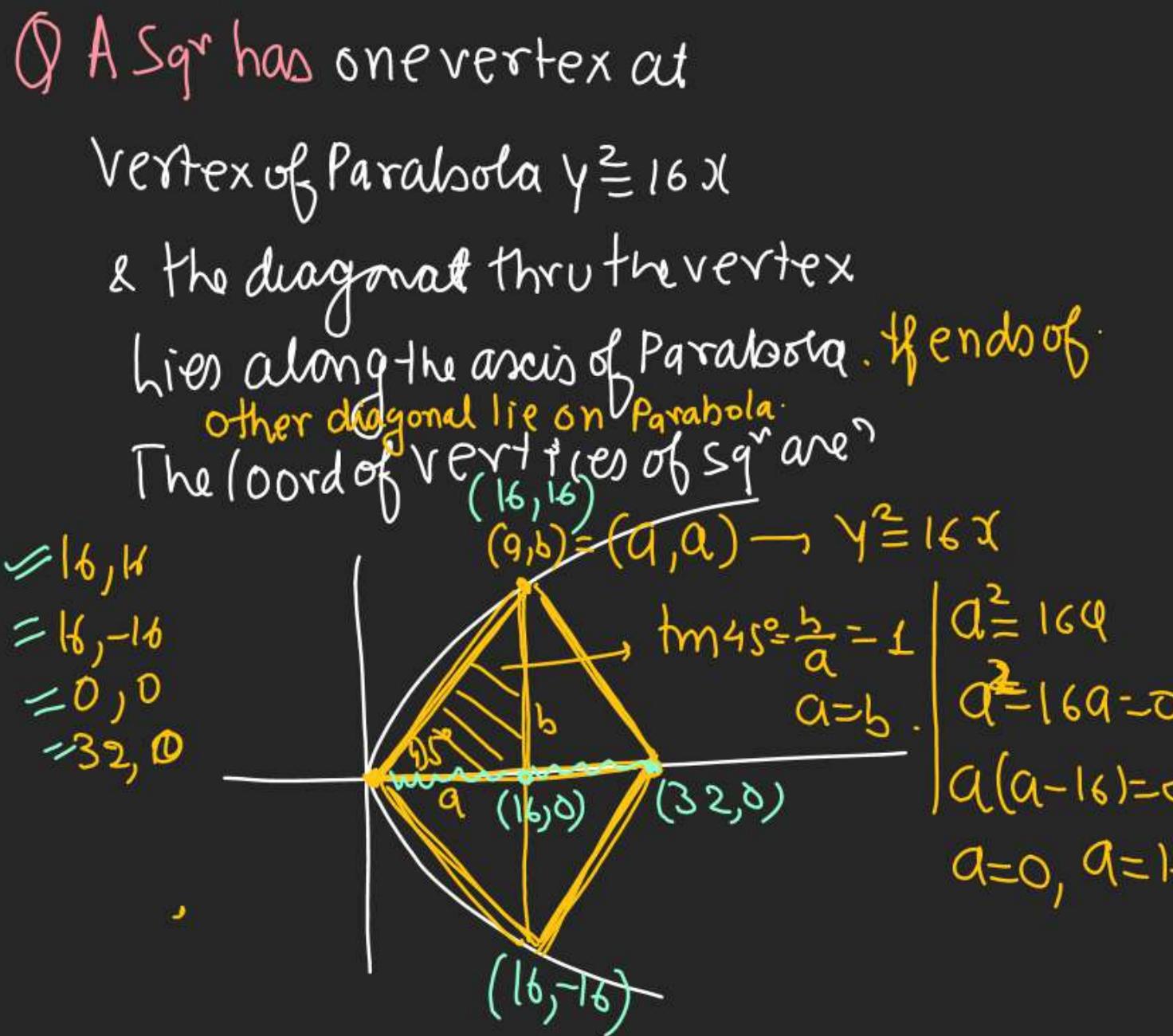
Q Find vertex, Axis, Focus

HW Directrix, LLL for

A)  $y^2 - 4x - 2y - 7 = 0$

B)  $9y^2 - 16x - 12y - 57 = 0$

C)  $x^2 + 8x + 12y + 4 = 0$

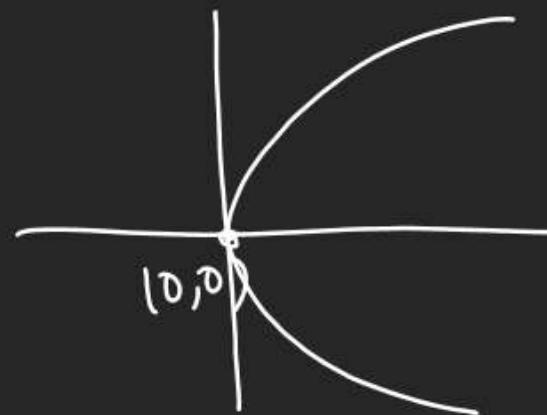


$x^2 = -4ay$  P.T.  $(6, -3)$

$$36 = +4a(-3) \Rightarrow a = 3$$

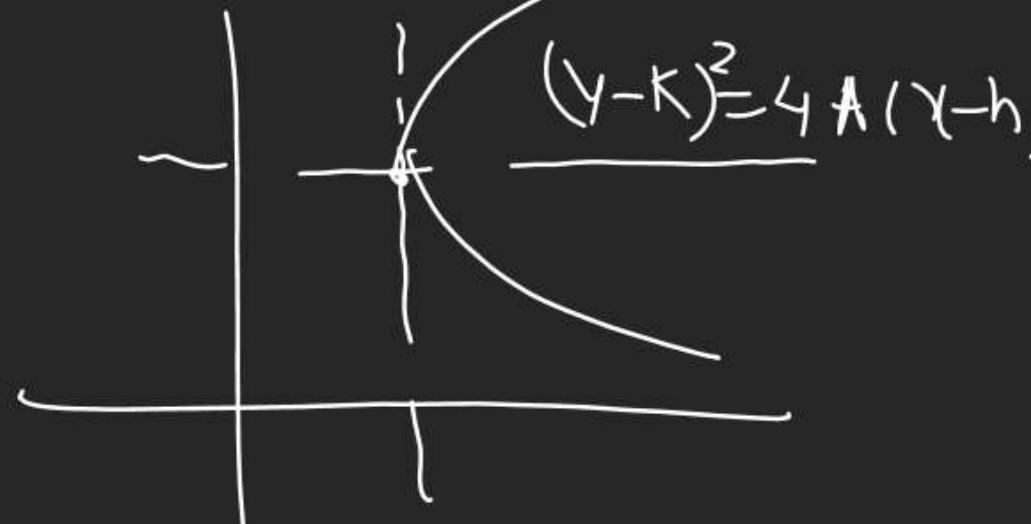
$$\therefore \text{Parabola} = \underline{x^2 = -12y}$$

# Shifting of vertex.

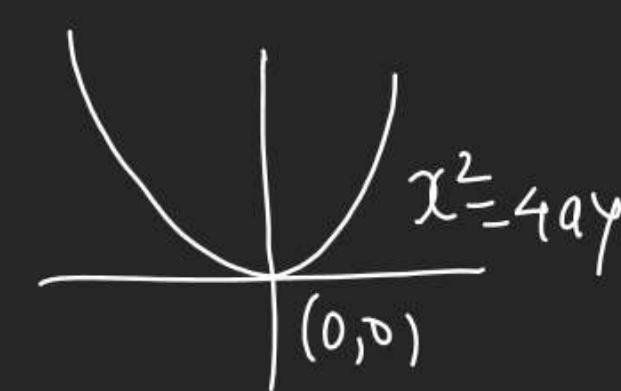


$$y^2 = 4ax$$

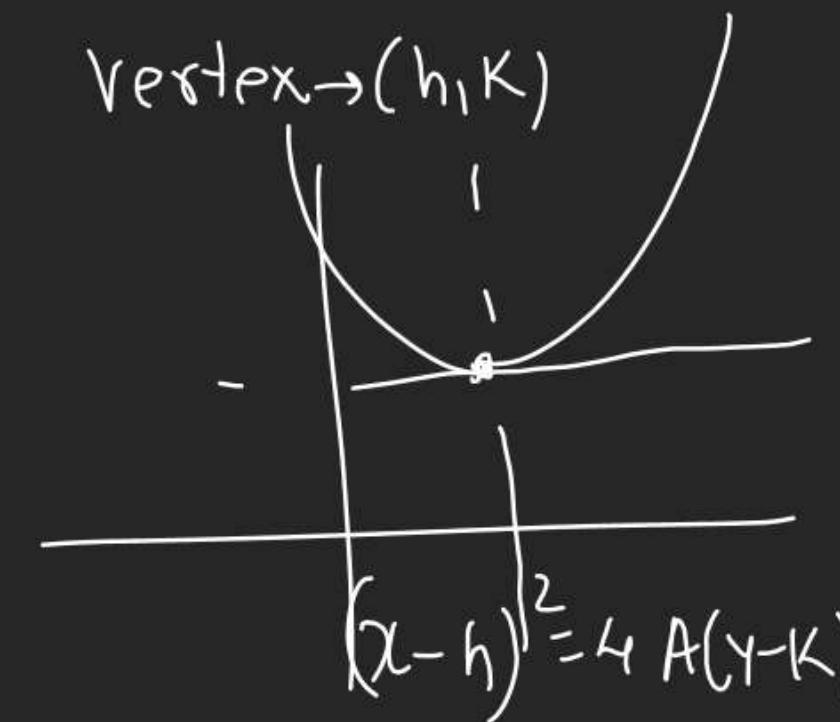
Vertex  $\rightarrow (h, k)$



$$(y-k)^2 = 4A(x-h)$$



Vertex  $\rightarrow (h, K)$



$$(x-h)^2 = 4A(y-K)$$

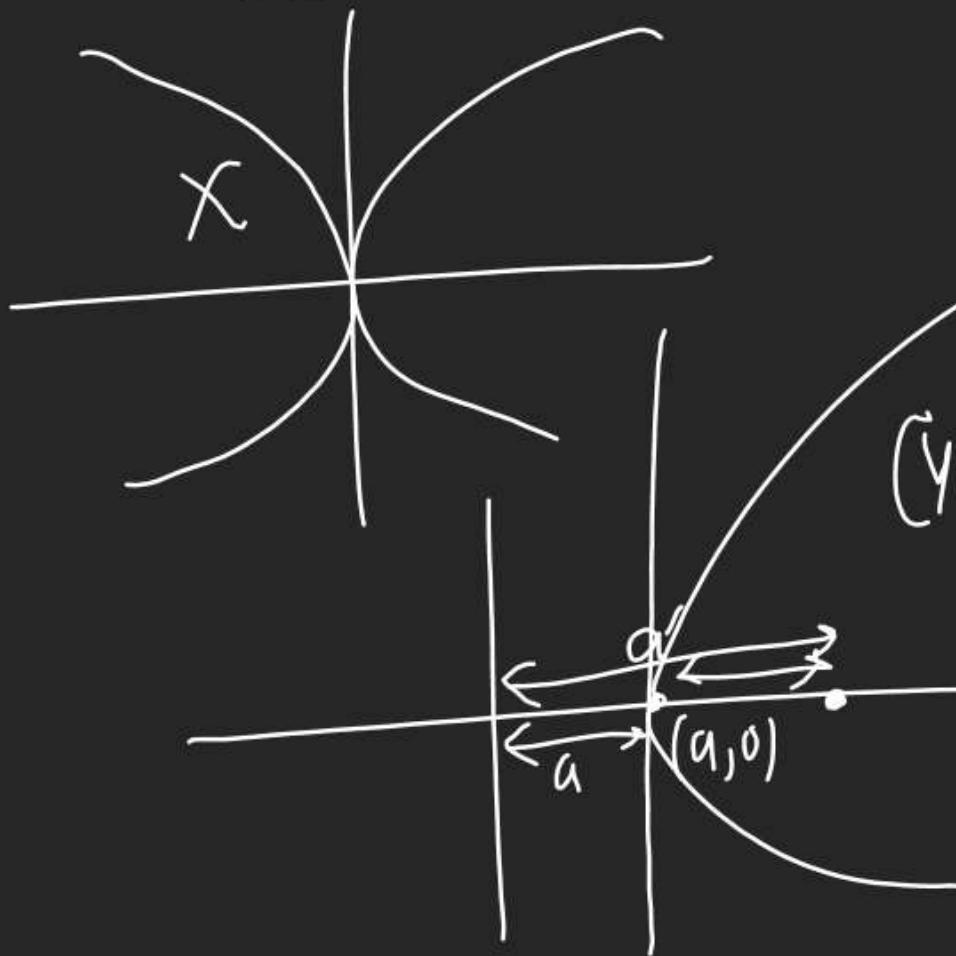
Q Find Eqn of Parabola.

Whose Axis x-axis &

vertex, focus are at

distance  $a, a'$  from origin

to +ve side.



$$y^2 = 4ax$$

$$(y-0)^2 = 4(a'-a)(x-a)$$

$$(y-0)^2 = 4(a'-a)(x-a)$$

Q Vertex of Parabola

Shifted to (2, 0) &

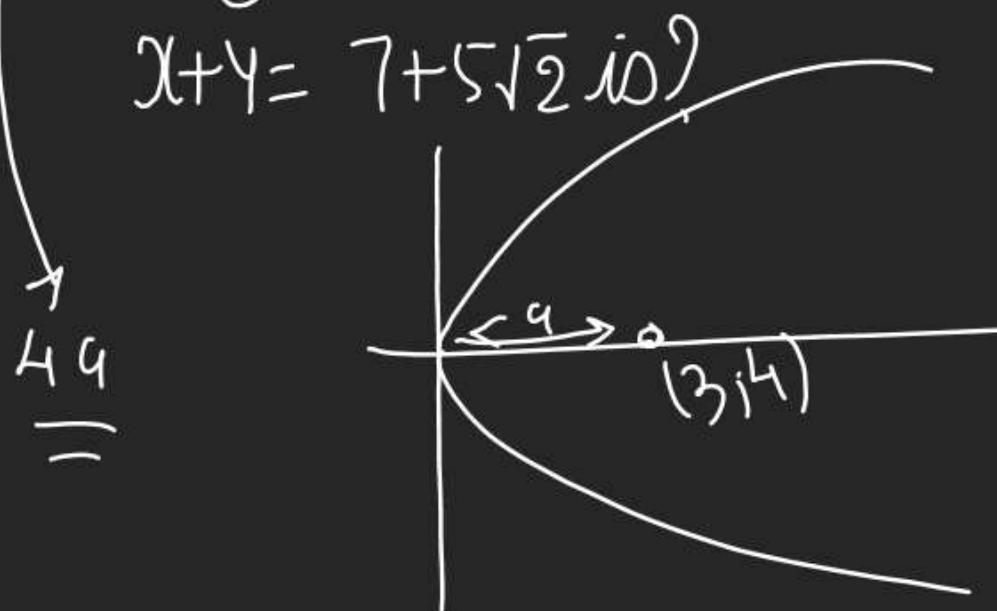
Axis in x-axis

Focus in (6, 0) find Eq of Par.



$$(y-0)^2 = 4 \times 4 (x-2)$$

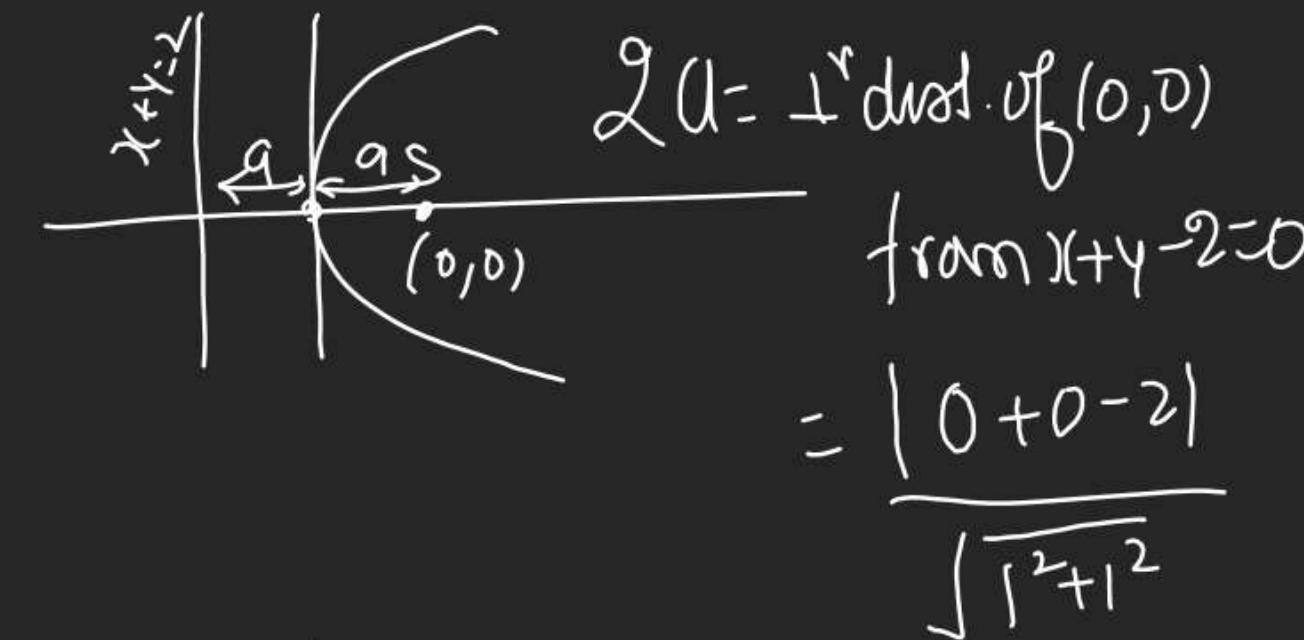
L.R. of Parabola whose  
Focus is  $(3, 4)$  & whose  
tangent at vertex has Eqn



$$\begin{aligned} a &= \text{dist of } (3, 4) \text{ from line } x+y-7-5\sqrt{2}=0 \\ &= \frac{|3+4-7-5\sqrt{2}|}{\sqrt{1^2+1^2}} \\ &= \frac{5\sqrt{2}-5}{\sqrt{2}} = 5 \end{aligned}$$

$$\text{L.R.} = 4a = 20$$

Dir. of Parabola is  $x+y=2$   
if focus is origin then L.R.  
of the Parabola is.

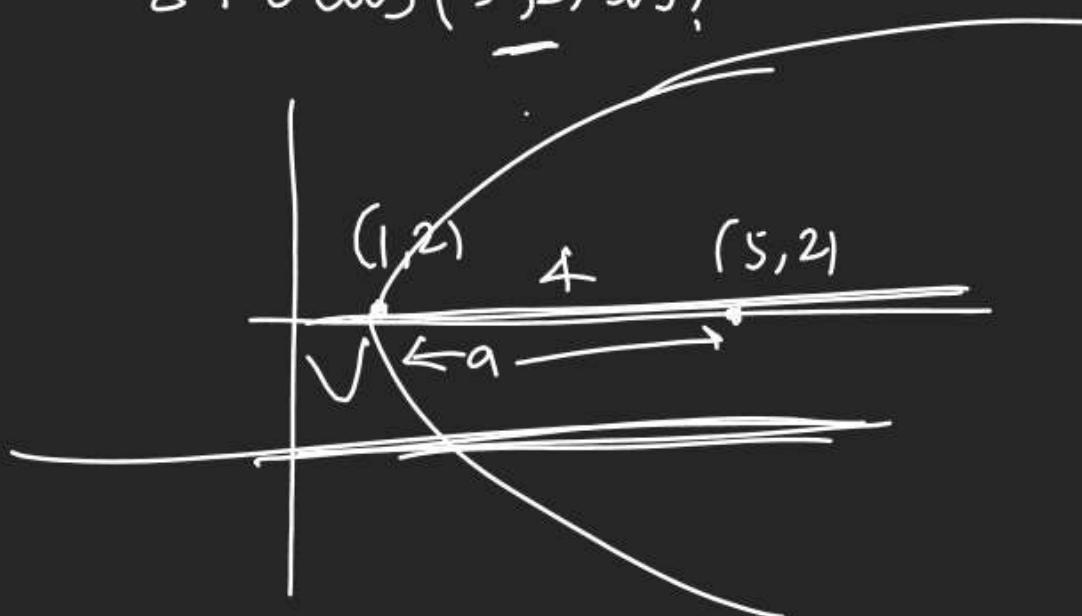


$$2a = \sqrt{2}$$

$$\text{L.R.} = 4a = 2\sqrt{2}$$

Q Find EOP Whose Vertex (1, 2)

& Focus (5, 2) is?



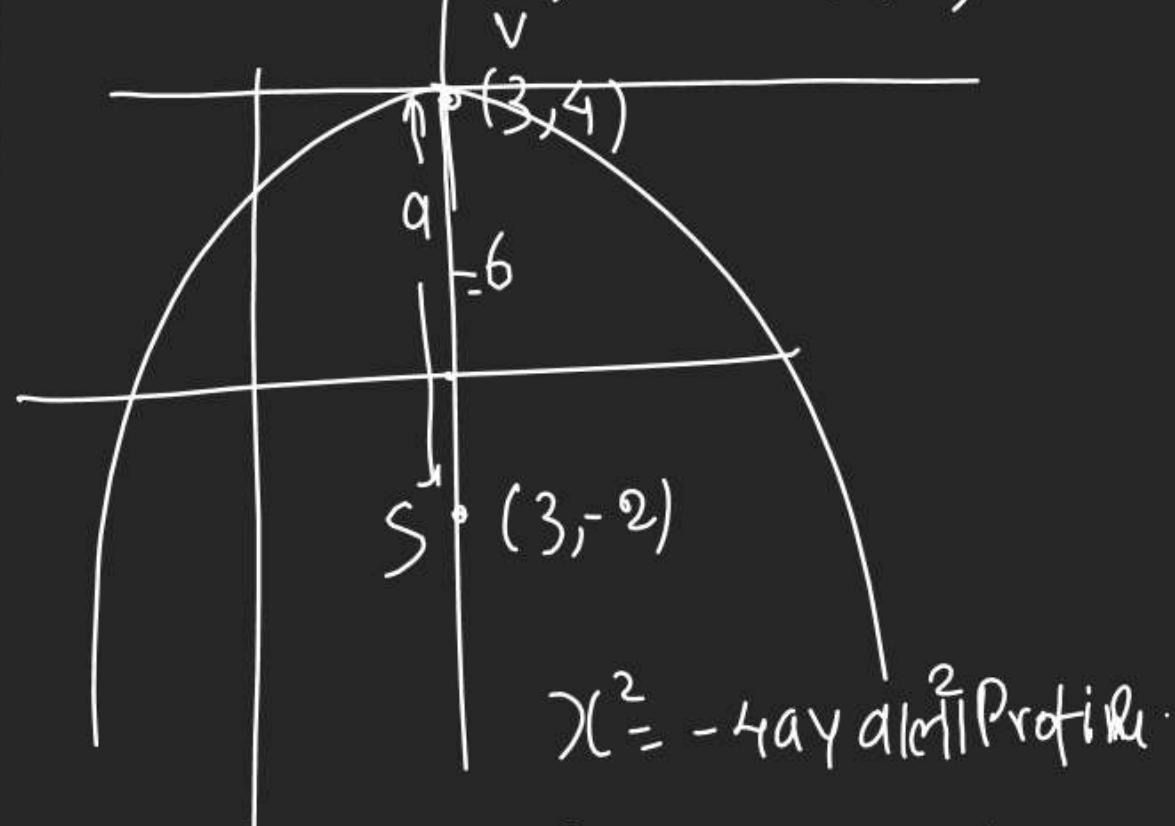
$y^2 = 4ax$  all Profite

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

$$(y-2)^2 = 16(x-1)$$

Q Find EOP Whose

Vertex (3, 4) & Focus (3, -2)



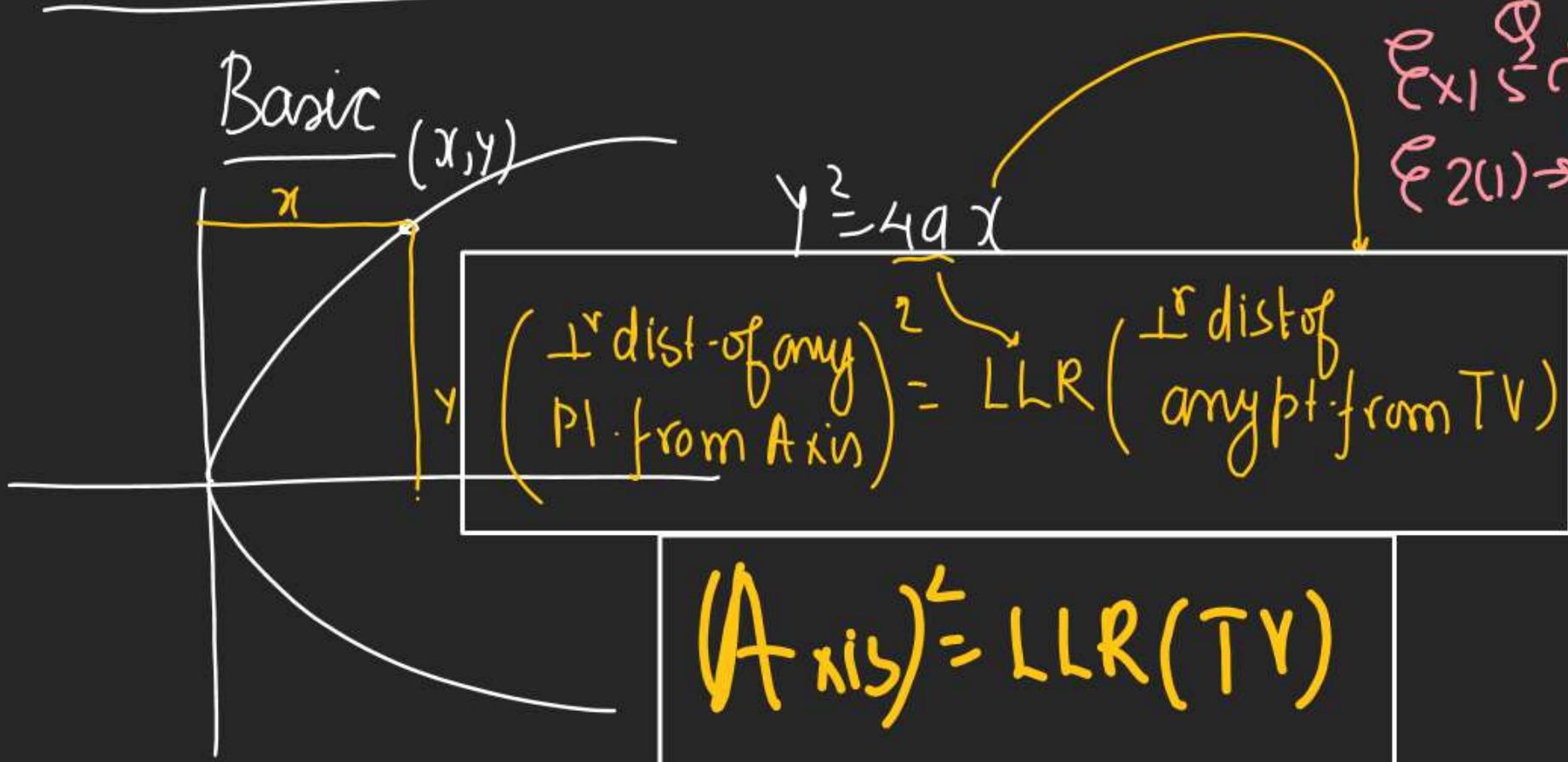
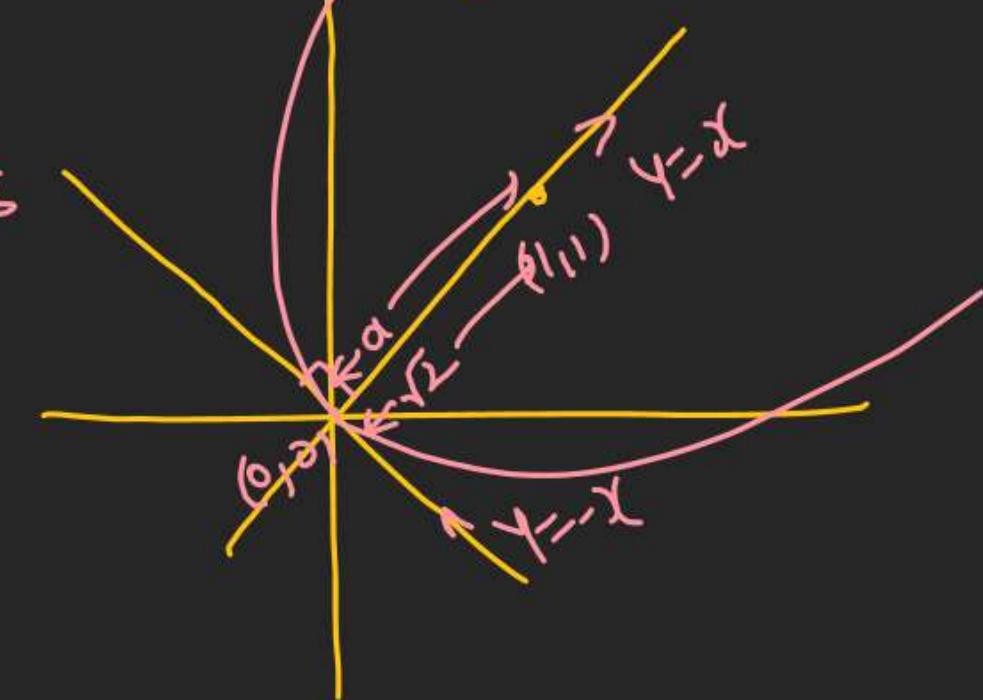
$y^2 = -4ax$  all Profite

$$(x-3)^2 = -4 \times 6(y-4)$$

$$(x-3)^2 = -24(y-4)$$

5<sup>th</sup> Profile.

TEDA PARABOLA hai Par bola Merahai

Q Find EOP if  $V = (0, 0)$  &  $S = (1, 1)$ 

$$\text{Axis} \Rightarrow x - y = 0$$

$$T.V. \Rightarrow x + y = 0$$

$$\left( \frac{|x-y|}{\sqrt{P^2+I^2}} \right)^2 = 4 \sqrt{2} \left( \frac{x+y}{\sqrt{2}} \right)$$

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