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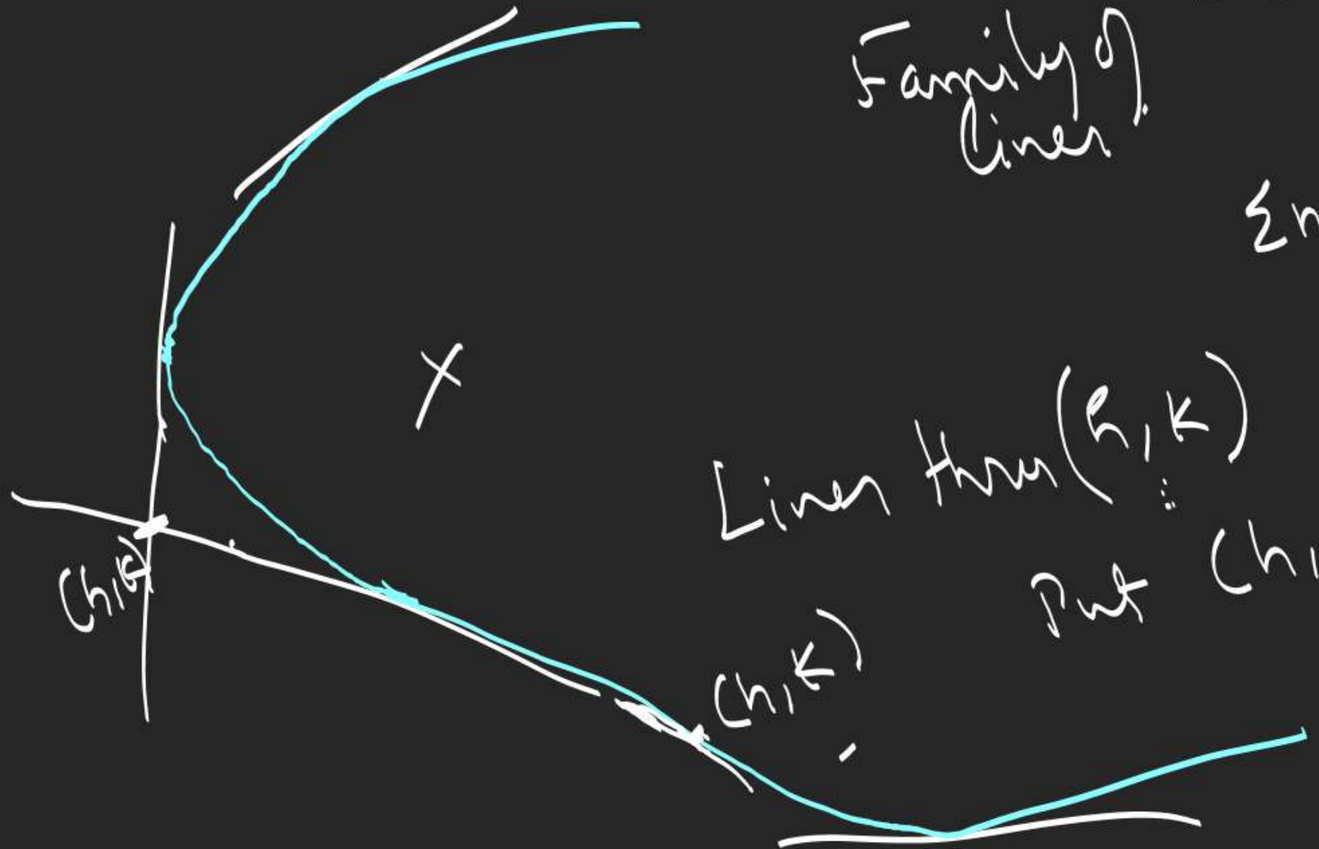
Envelope.

Family of lines $\rightarrow$ $my - m^2x - 1 = 0$, $m \in R$.

Envelope = ?



Lines thru (h,k)

Put (h,k)

(h,k) $\Rightarrow$ $m^2h - mk + 1 = 0$

- 2 distinct lines
- 2 coincident lines
- no line

$\Rightarrow D = 0 \Rightarrow$ $k^2 - 4h = 0$

Family of lines : $P\lambda^2+Q\lambda+R=0$

P, Q, R are linear in x, y,

$\lambda \rightarrow$ parameter

$(\sin\lambda)(x+2y)-(\ln\lambda)y$

$(2x-3y+7)\lambda^2+(x-y)\lambda+(4x+3y+1)=0$

$+(\lambda^2-e^\lambda+2)(x+y+1)=0$

Envelope = ?

$D=0 \Rightarrow \boxed{Q^2=4PR}$

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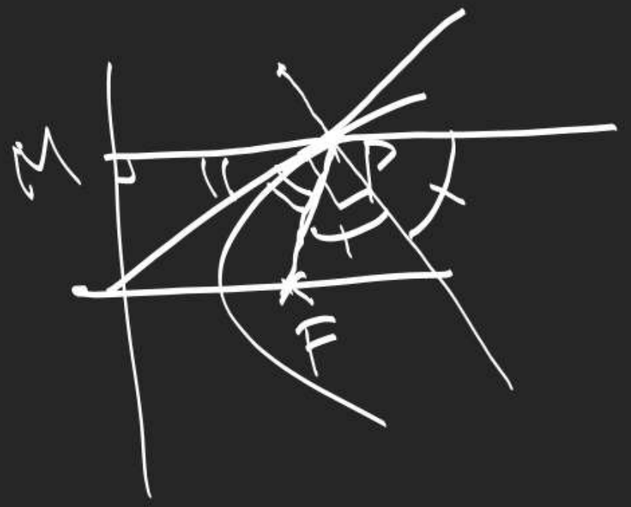
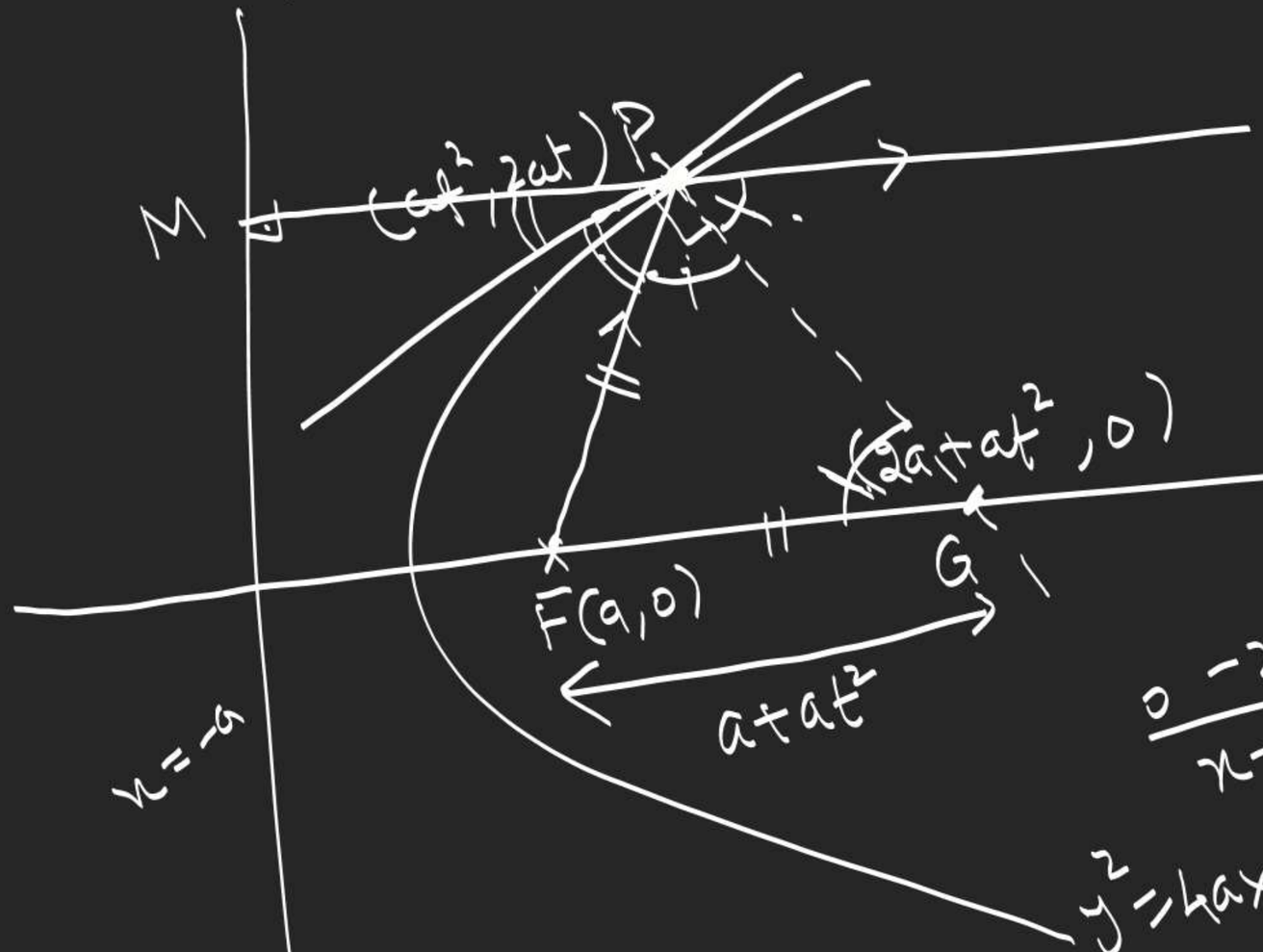
Note → (1) Reflection Prop



A.



$$\frac{0-2at}{x-at^2} = -t$$

$$x - at^2 = 2a$$

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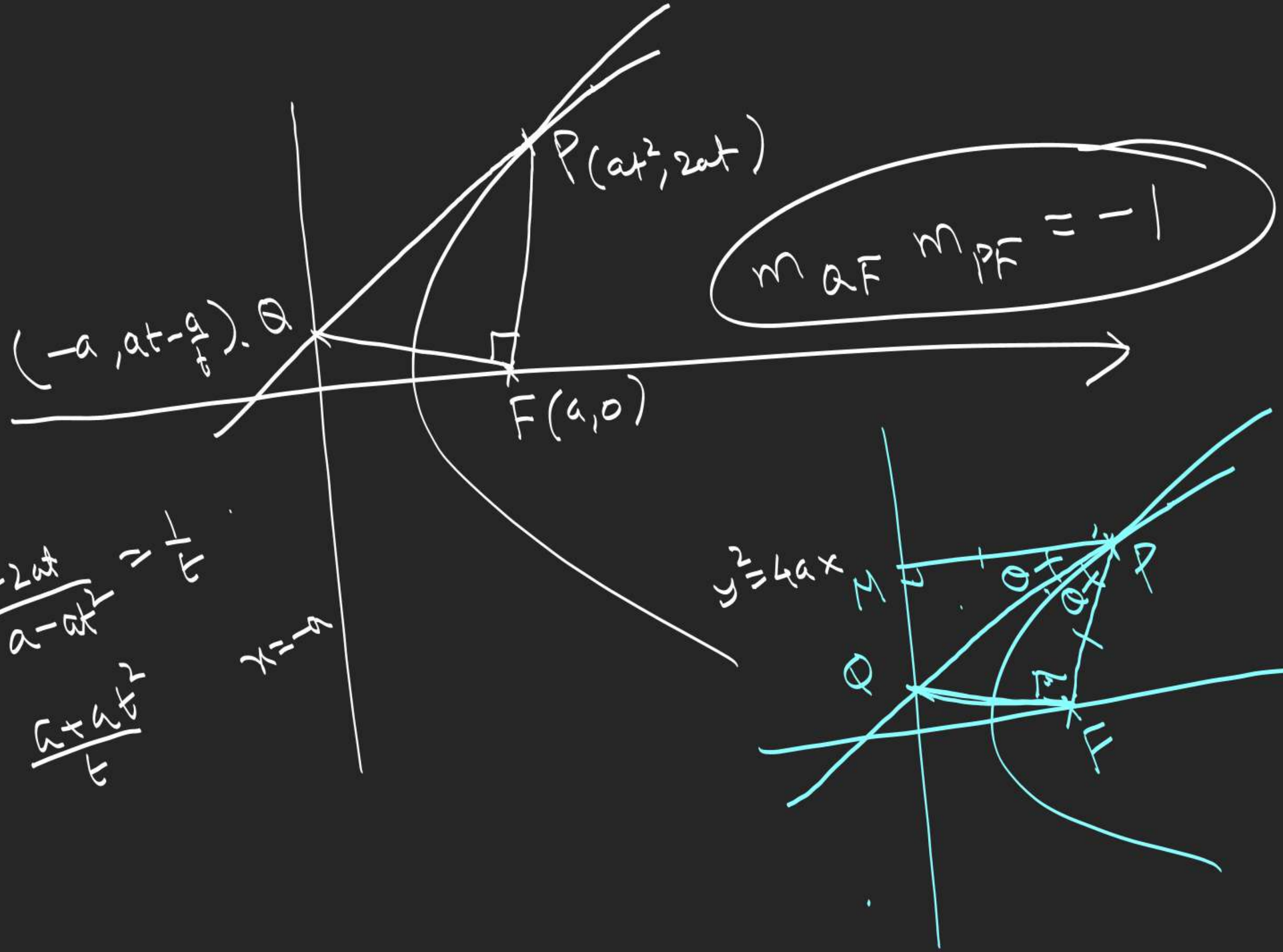
(2)



$$\frac{y-2at}{-a-at^2} = \frac{1}{t}$$

$$2at - \frac{a+at^2}{t}$$

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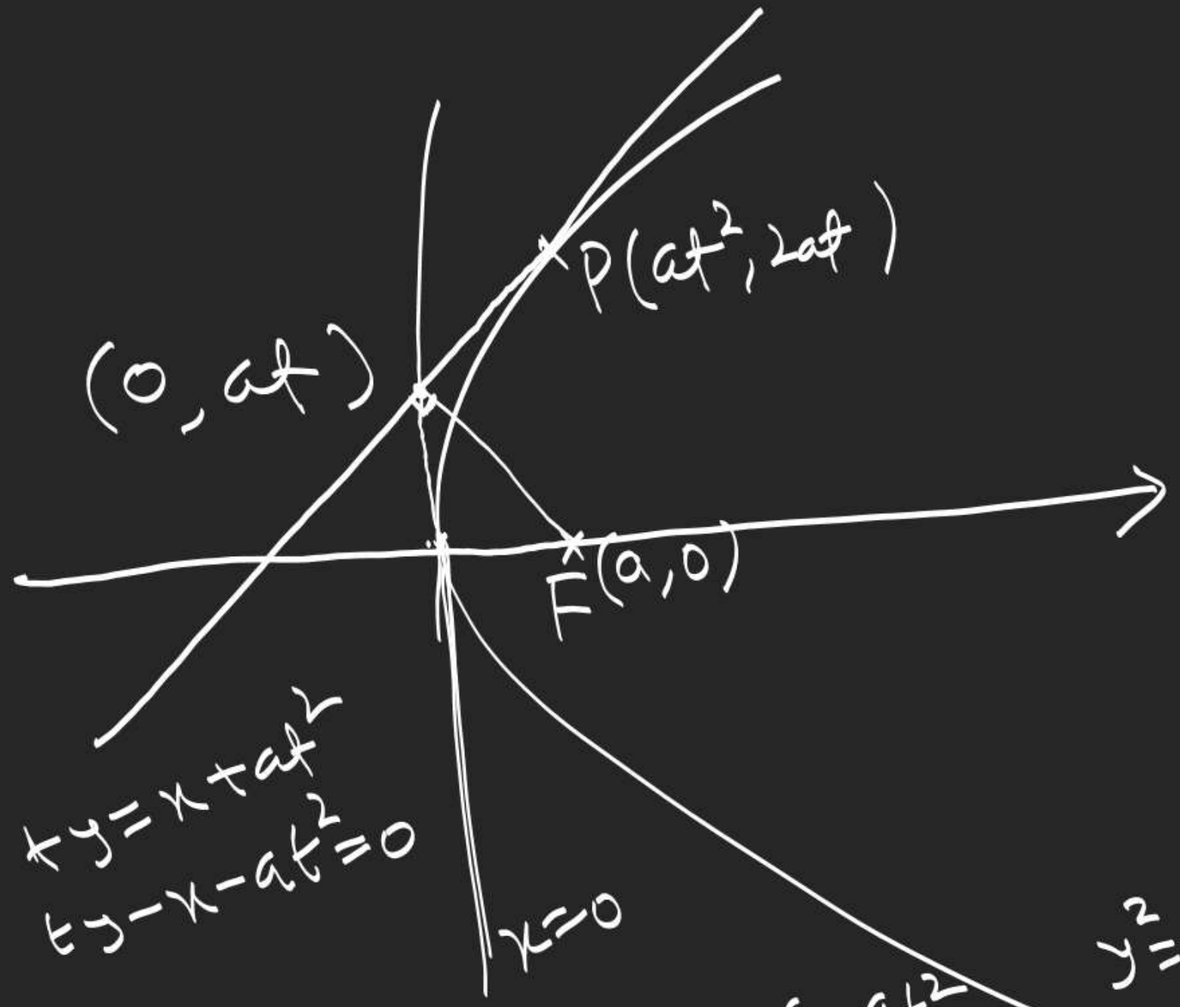
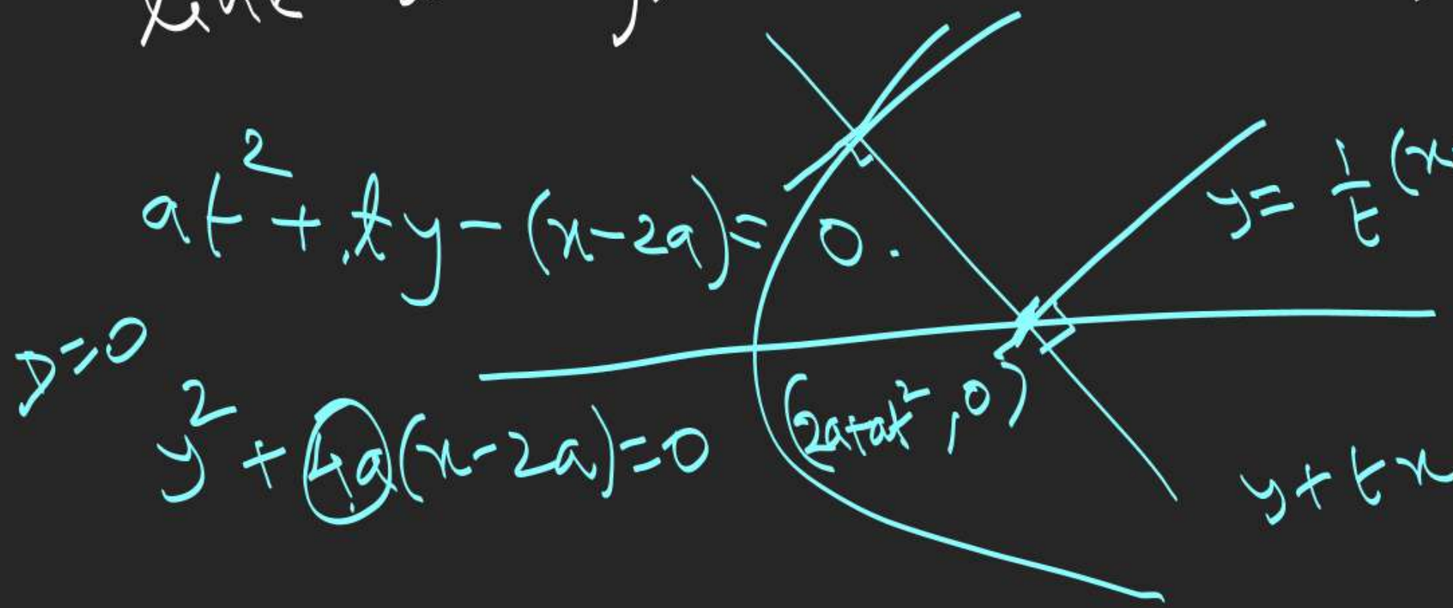
3.



$$\frac{x-a}{-1} = \frac{y-0}{t} = -\frac{-a-at^2}{1+t^2}$$

$$\frac{x-a}{-1} = a \Rightarrow \boxed{x = 0}$$

1: From the point where any normal to parabola $y^2=4ax$ meet its axis is drawn a line perpendicular to this normal. P.T. this line always touches an equal parabola.



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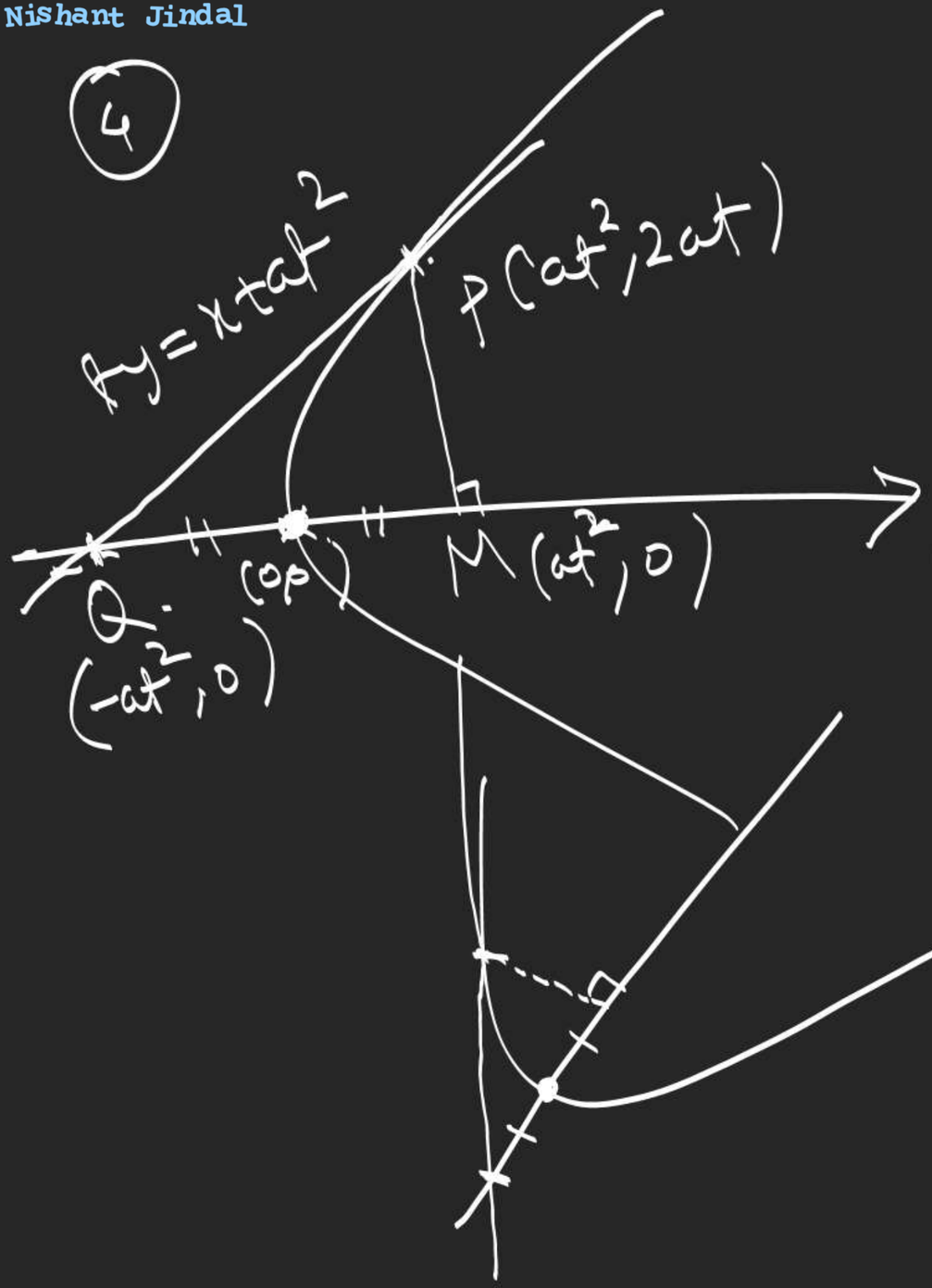
(4)



Ex-28

9, 11, 14, 17, 23,

Ex-29

4, 7, 8, 10, 23, 27.

Ex-30

2, 3, 13, 15, 18, 21, 25, 26, 29, 30.

Paper 2