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Q6 ~ DPP6

Q7 Copy

Q8 A 3 B=9

$${}^3C_1 \times {}^9C_1 + {}^3C_2 \times {}^9C_2 + {}^3C_3 \times {}^9C_3$$

Q9 ~ AAA MMMOO

$$\left(\frac{8!}{3!3!2!} \times \frac{1}{2!}\right) \times 2!$$

Q10 10 Identical Apple → 3 tr.

$${}^{10+3-1}C_{3-1} = {}^{12}C_2 = \frac{12 \times 11}{2} = 66$$

$N = 2^3 3^5 5^7 7^9$

$2^0/2^2 \rightarrow 2$

$3^0/3^2/3^4 \rightarrow 3$

$5^0/5^2/5^4/5^6 \rightarrow 4$

$7^0/7^2/7^4/7^6/7^8 \rightarrow 5$

No W = $2 \times 3 \times 4 \times 5 = 120$ ways.

Q13 SSSS I L I I PP M

$4A + 1D = {}^2C_1 \times {}^3C_1 = 6$

$3A + 2A = {}^2C_1 \times {}^2C_1 = 4$

$3A + 2D = {}^2C_1 \times {}^3C_1 = 6$

$2A + 2A + 1D = {}^3C_2 \times {}^2C_1 = 6$

$2A + 3D = {}^3C_1 \times {}^3C_3 = 3$

} 25

Ans = (25) Set

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14) Total - All Vowel together

$$\frac{11!}{4!4!2!_2} - \frac{8!}{4!2!}$$

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Parabola.

Q Find Nature of locus of Pt. which moves such that its distance from $(1,-3)$ is **double** of its distance from $2x-y-5=0$

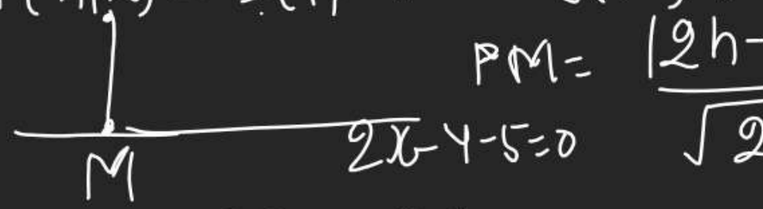
(1) Pt $=(1,3)$ Satisfies $2x-y-5=0$

$2+3-5=0$

as Pt. Lies on Line $\Rightarrow$ it is Pair of St. Line

(2) $P(h,k)$ — $S(1,-3)$ $SP=\sqrt{(h-1)^2+(k+3)^2}$

$PM=\dfrac{|2h-k-5|}{\sqrt{2^2+-1^2}}$



$SP=2PM$

$\sqrt{(h-1)^2+(k+3)^2}=2\dfrac{|2h-k-5|}{\sqrt{5}}$

{Sq. for Locus}

Q Find Locus of Pt. which moves such that Ratio of its distance from $(1,2)$ & Line $4x-3y+2=0$ is $\sqrt{3}$.

(1) $(1,2)$ in $4x-3y+2=0$

$4-6+2=0 \Rightarrow 0=0$

Satisfy.

(2) $\dfrac{SP}{PM}=\sqrt{3} \Rightarrow \sqrt{(h-1)^2+(k-2)^2}=\sqrt{3}\dfrac{|4h-3k+2|}{\sqrt{4^2+-3^2}}$

$25\{(x-1)^2+(y-2)^2\}=3(4x-3y+2)^2$

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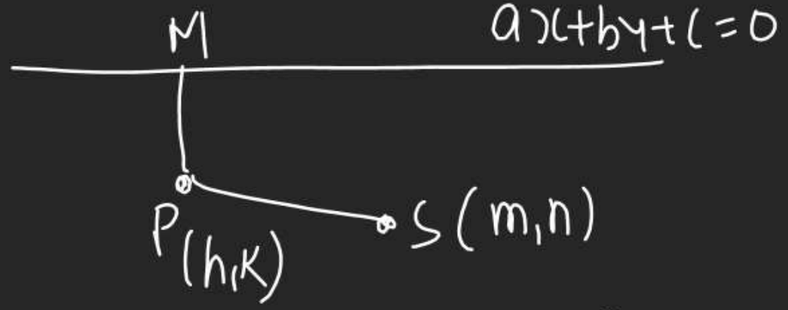
General Eqn of Parabola.

General Eqn of Line → $ax+by+c=0$

Variable Pt := $P = (h, K)$

Fixpt := (m, n)



for Parabola :) $\frac{SP}{PM} = e = 1$

$\Rightarrow SP = PM$

$$\sqrt{(h-m)^2+(K-n)^2} = \frac{|ah+bK+c|}{\sqrt{a^2+b^2}}$$

$$\boxed{(a^2+b^2)((x-m)^2+(y-n)^2) = (ax+by+c)^2}$$

General Eqn of Parabola

$$(bx-ay)^2+2gx+2fy+k=0$$

→ Symbolic form of Parabola.

Gen Eqn of Parabola.

(1) It contains a Per sqr.

(2) It contains a Linear term

(3) It may contain Constant Term.

Q $x^2+y^2+2xy+5=0$ is a Parabola or not

$(x+y)^2+5=0$

Not Containing Linear term.

:) Not a Parabola

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Q $x^2-y^2+2xy+5=0$ is a Parabola?

x^2-y^2+2xy → This is not a Per. Sq^r.

⇒ Not a Parabola.

Q $2x^2+y^2-4xy=8$ is a Parabola?

No Per. Sq^n No linear term.

⇒ Not a Parabola

Q $4x^2+5x-3y+1=0$ is a Parabola?

$(2x)^2+5x-3y+1=0$

$(2x)^2$ — Per Sq^r ; $5x-3y+1$ — Linear term

Yes!!

it is a Parabola

Q. $(4x^2+9y^2-12xy)+x+1=0$ is a Parabola?

$(2x-3y)^2+x+1=0$

$(2x-3y)^2$ — Per. Sq^r ; x — Linear term

Yes.

it is a Parabola.

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Q Find Eqn of Parabola if

Focus is (5,3) & Dir. is

$3x-4y+1=0$.

for Parabola $\frac{SP}{PM}=1$

$\Rightarrow SP=PM$

Let $P\equiv(x,y)$

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

$$25(x-5)^2+25(y-3)^2=(9x^2+16y^2+1-24xy+6x-8y)$$

$$16x^2+9y^2+24xy-256x-142y+840=0$$

$$(4x+3y)^2-256x-142y+849=0$$

Standard Eqn of Parabola

1) Directrix $\rightarrow x=-a$

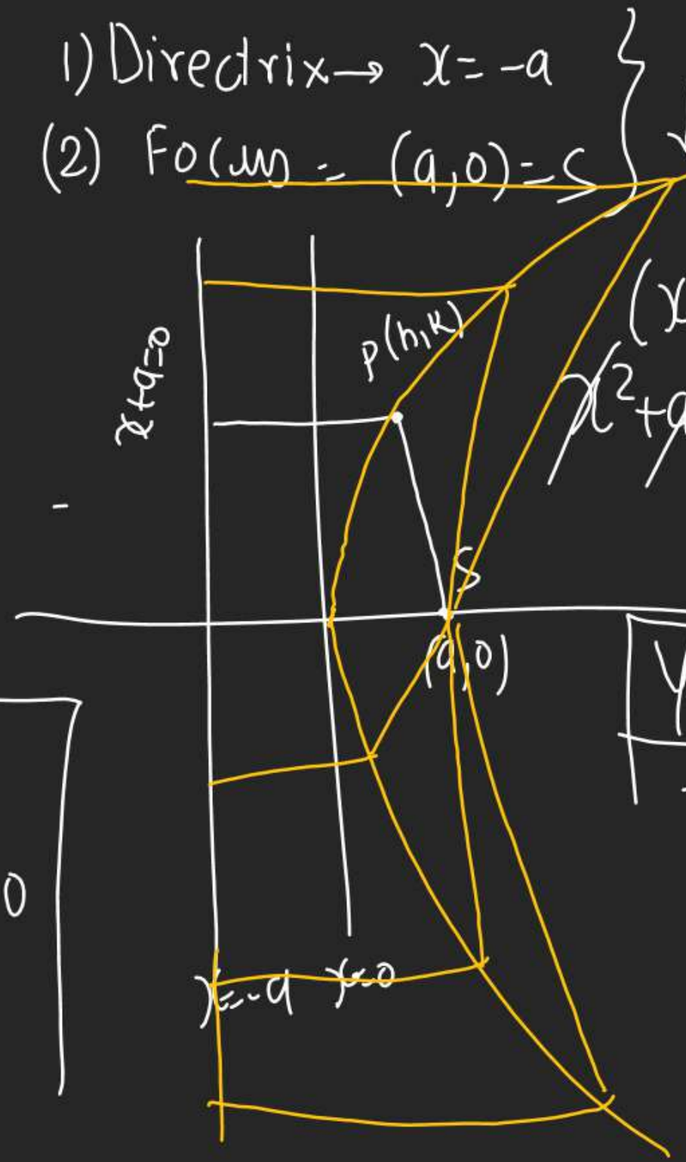
(2) Focus $=(a,0)=S$

$SP=PM$

$$\sqrt{(h-a)^2+(k-0)^2}=\frac{|h+a|}{\sqrt{1^2+0^2}}$$

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

$$x^2+a^2-2ax+y^2=x^2+a^2+2ax$$



$$y^2=4ax$$

This is Standard Parabola

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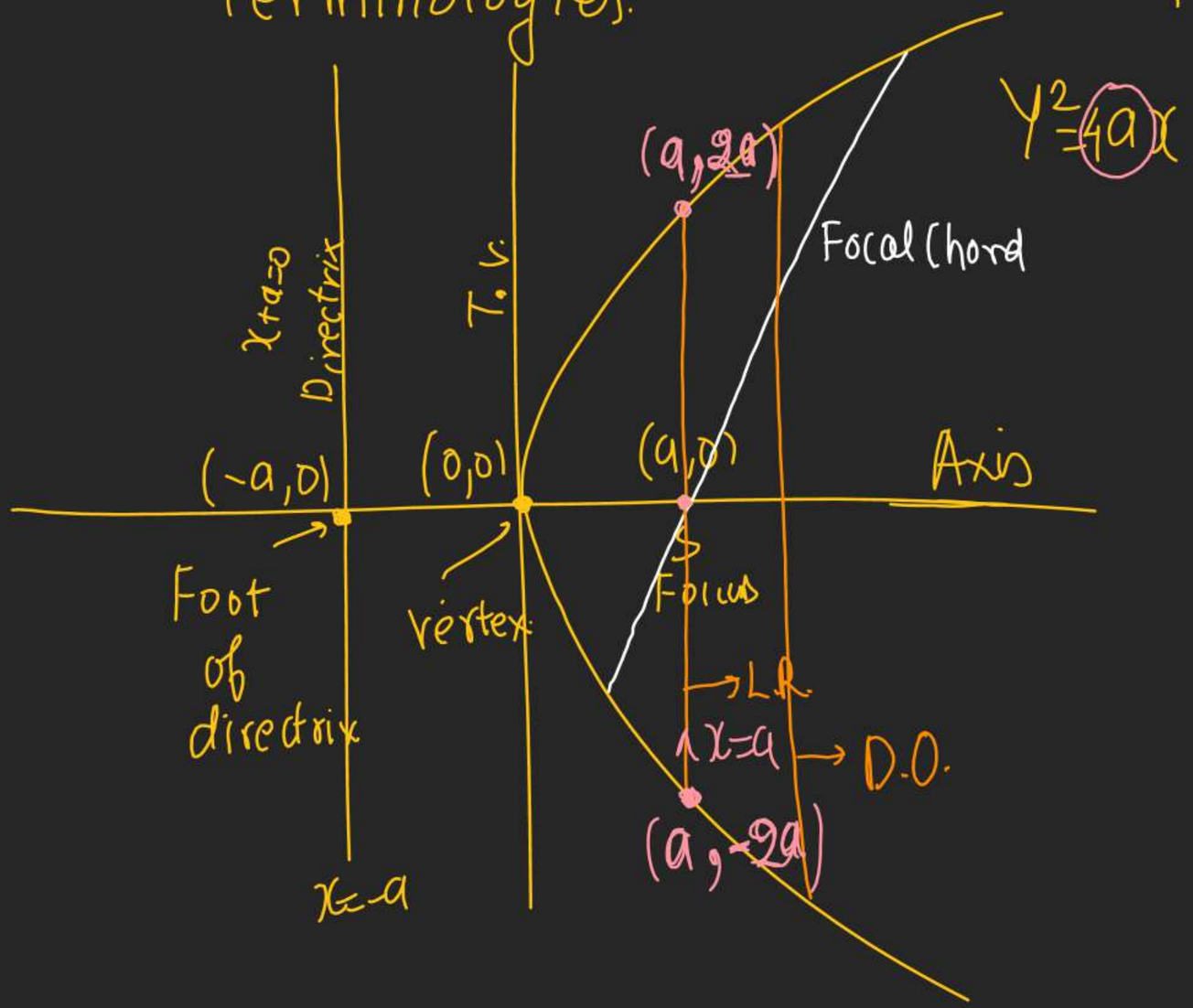
Terminologies.



T.V = Tangent at vertex

Focal Chord = Chord P.T. Focus

L.R. = Latus Rectum = Focal Chord $\parallel^{el}$ to directix

D.O. = Double Ordinate = Any Chord $\parallel^{el}$ to Directix

LLR = Length of L.R.

(7) L.R.'s End Pt = $(a, 2a)(a, -2a)$

(8) L.L.R. = $4a$ = Coff. of x

1) Vertex = $(0,0)$

2) Foot of Dir = $(-a,0)$

3) Focus $\Rightarrow$ $(a,0)$

4) Axis $\rightarrow$ $Y=0$

5) Directrix $\rightarrow$ $x=-a$

6) T.V $\Rightarrow$ $x=0$

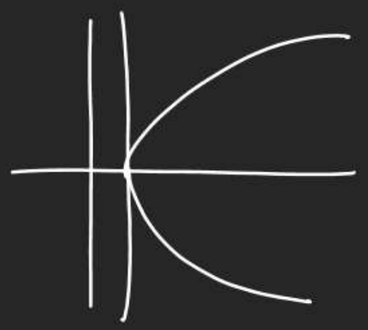
at L.R. $x=a$ in $Y^2=4ax$

$Y^2=4a^2$

$Y=\pm 2a$

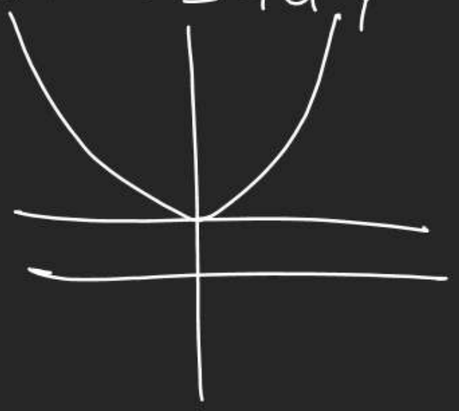
4 Standard Cases of Parabola.

(1) $y^2 = 4ax$

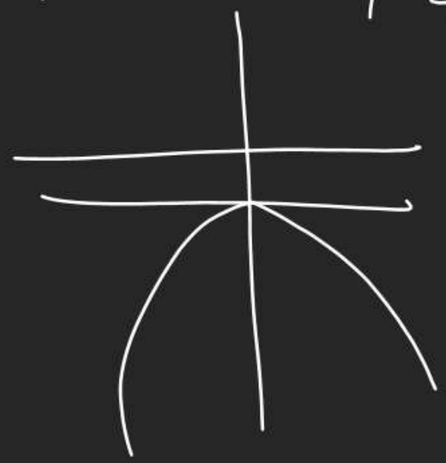


(2) $y^2 = -4ax$ → X Axis को -ve Side की ओर

(3) $x^2 = 4ay$



(4) $x^2 = -4ay$ → Y Axis को -ve Side की ओर



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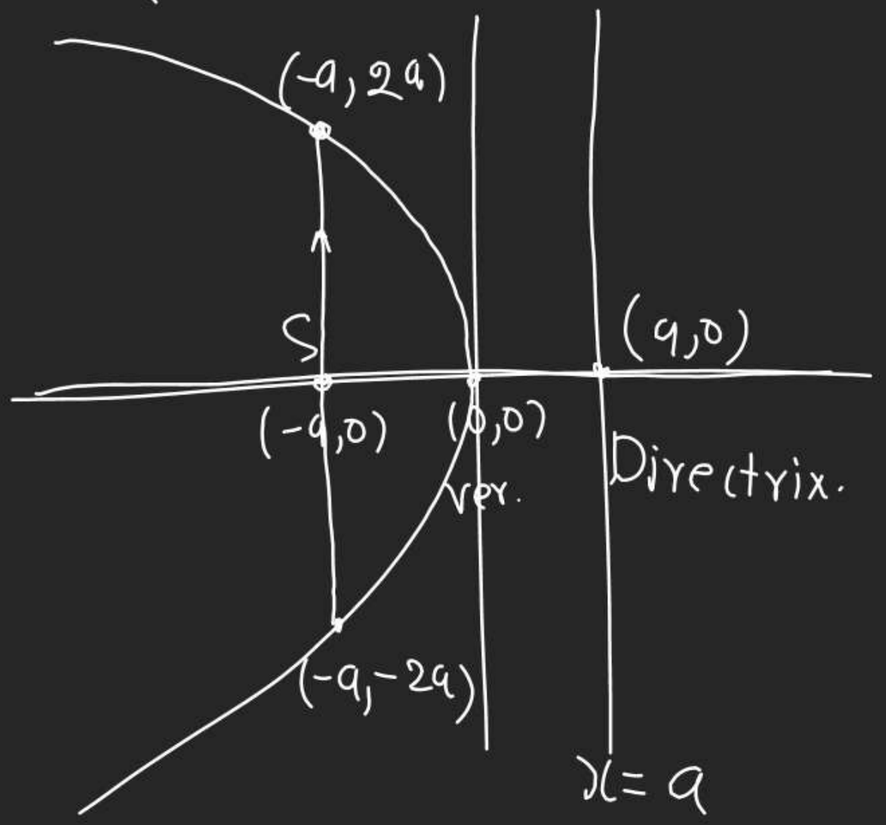
(2) $y^2 = -4ax$



$x = -a$ in $y^2 = -4ax$

$y^2 = -4a(-a)$

$y^2 = 4a^2$

$y = \pm 2a$.

① Axis $\Rightarrow$ $y = 0$

② Directrix $\Rightarrow$ $x = a$

(3) F.D. $(x = a, y = 0)$

(4) Vertex $(x = 0, y = 0)$

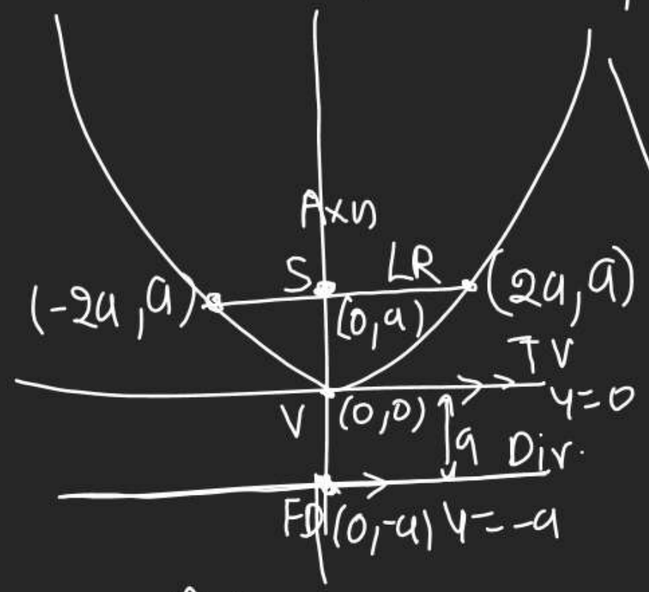
(5) Focus $(x = -a, y = 0)$

(6) T.V. $\rightarrow$ $x = 0$

(7) LR's endpt $(-a, 2a)$ & $(-a, -2a)$

(8) LLR $= 4a$

(3) $x^2 = 4ay$



$y = a$ in

$x^2 = 4ay$

$x^2 = 4a \times a$

$x^2 = 4a^2$

$x = \pm 2a$

① Axis $x = 0$

(2) Dir $\Rightarrow$ $y = -a$

(3) F.D. $\Rightarrow$ $x = 0, y = -a$

(4) Vertex $(x = 0, y = 0)$

(5) Focus $\Rightarrow$ $x = 0, y = a$

(6) T.V $\Rightarrow$ $y = 0$

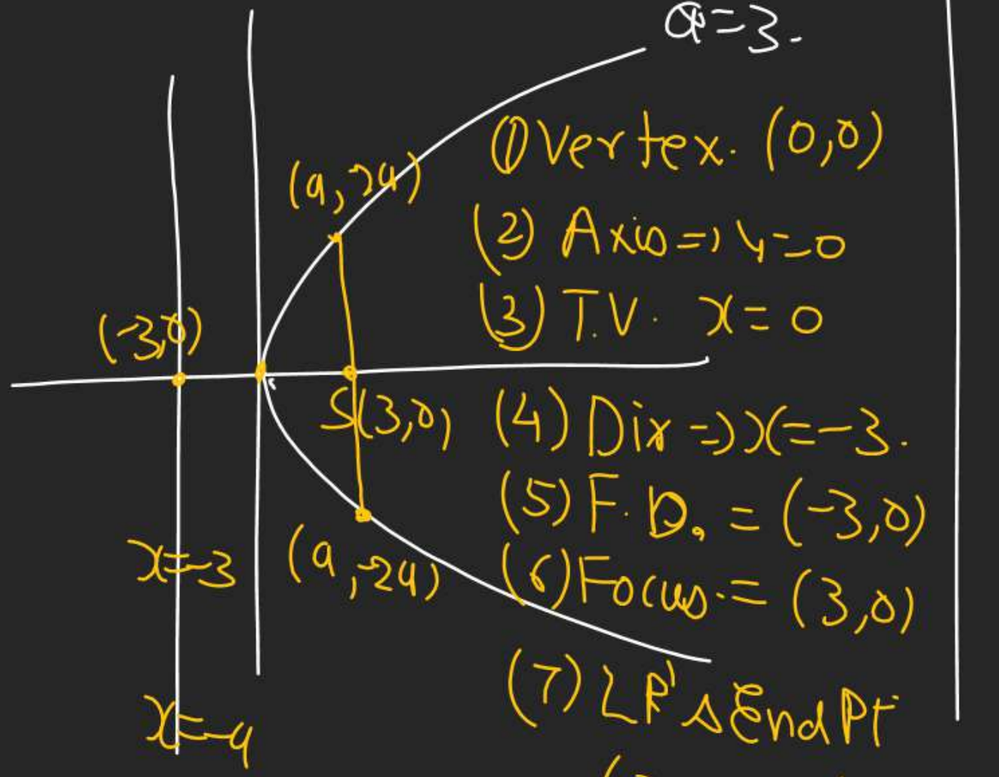
(7) LLR $= 4a$

Q Find all Terminologies for.

$y^2 = 12x$

$y^2 = 4ax \Rightarrow 4a = 12$

$a = 3.$



(1) Vertex. (0,0)

(2) Axis $\Rightarrow y = 0$

(3) T.V. $x = 0$

(4) Dir $\Rightarrow x = -3.$

(5) F. D. = (-3, 0)

(6) Focus = (3, 0)

(7) LR's End Pt

(3, 6) & (3, -6)

(8) LLR = 12

HW

$y^2 = 16x$

HW

$y^2 = -4x.$