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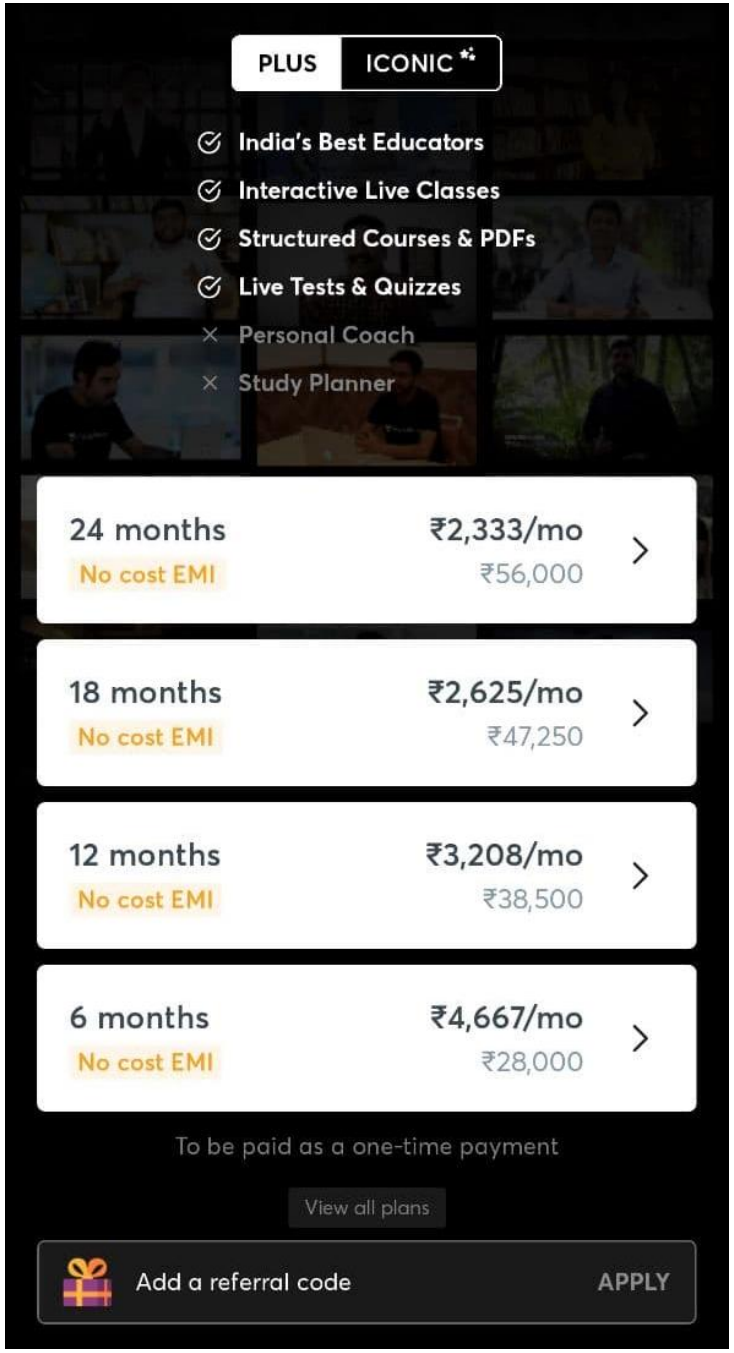

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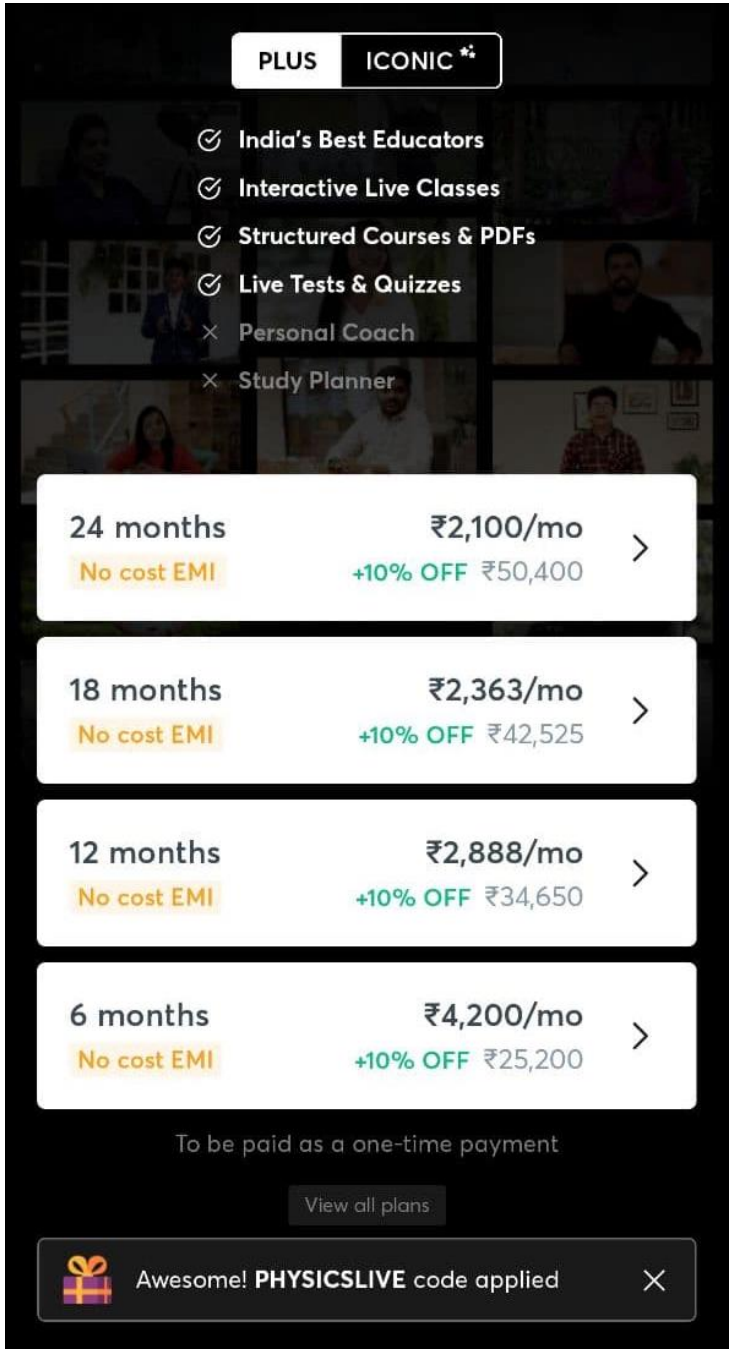

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IIT JEE
Physics DPP

DPP-3 Basic Maths: Geometry (Mathematical Curves)

By Physicsaholics Team

Q) Which of the following is an equation of circle:

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

(b) $x^2y + y^2 = 2^2$

(c) $xyz + y^2 = 2^2$

(d) None of these

Ans. a

Equation of circle

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

where; (a, b) centre

& r = radius.

$\therefore$ $x^2 + y^2 = 2^2$

is equation of circle.

with centre $(0, 0)$

and radius = 2 unit.

Q) Which of the following is an equation of parabola:

(a) $x^2 = 4ay$

(b) $y^2 = 2^2bx$

(c) $x^2 = cy$

(d) All of these

Ans. d

Equation of Parabola

$y^2 = 4ax$ [where, 4a & 4b are

(or) $x^2 = 4by$ constants]

comparig given equation with these standard forms: (a) $x^2 = 4ay$ (Parabola) ✓

(b) $y^2 = 2^2bx$ [$4a = 2^2b$] ✓

(c) $x^2 = cy$ [$4b = c$] ✓

∴ a, b, c all are equation of parabola.

Q) Which of the following is an equation of ellipse:

(a) $\frac{x^2}{a} + \frac{y^2}{b} = 1$

(b) $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$

(c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

(d) All of the above

Ans. d

Ellipse:

(a) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

(b) $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$

(c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

all are equation of Ellipse.

Q) Which of the following is not an equation of circle:

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

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

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

(d) None of these

Ans. d

Equation of circle

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

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

centre, C:(2, 1) ; radius, $r = 2$ unit

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

C $(-2, 4)$, $r = 2$ unit

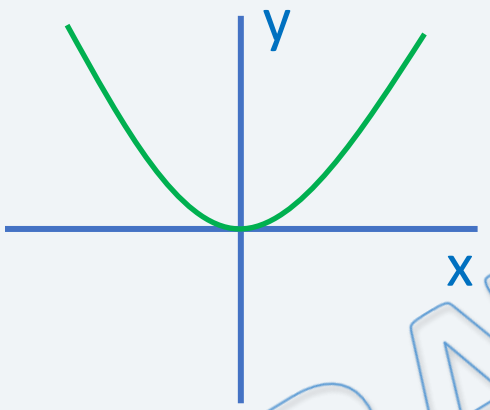
(c) $(x-2)^2 + y^2 = 2^2$

$C(2, 0)$, $r = 2$ unit.

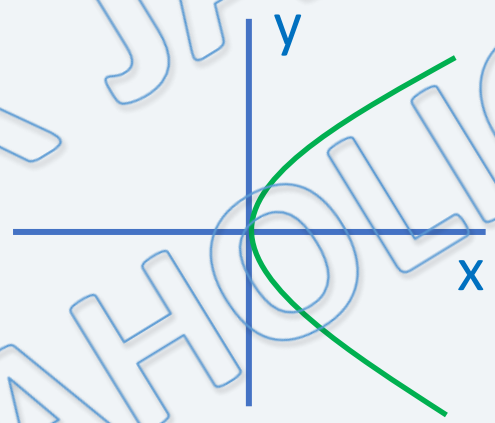
∴ all are equation of circle.

Q) Curve of $Y = 3x^2$ can be:

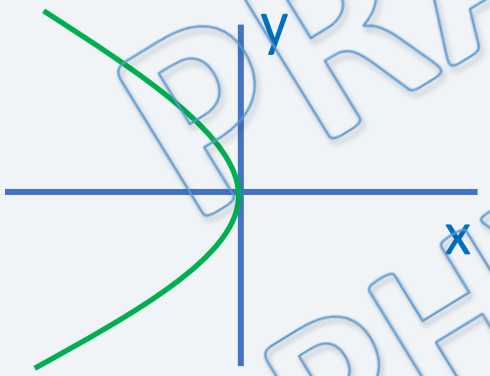
(a)



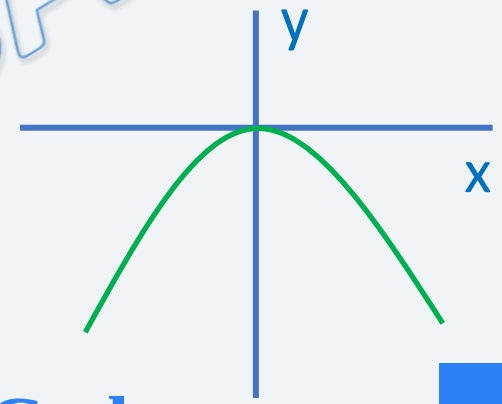
(b)



(c)



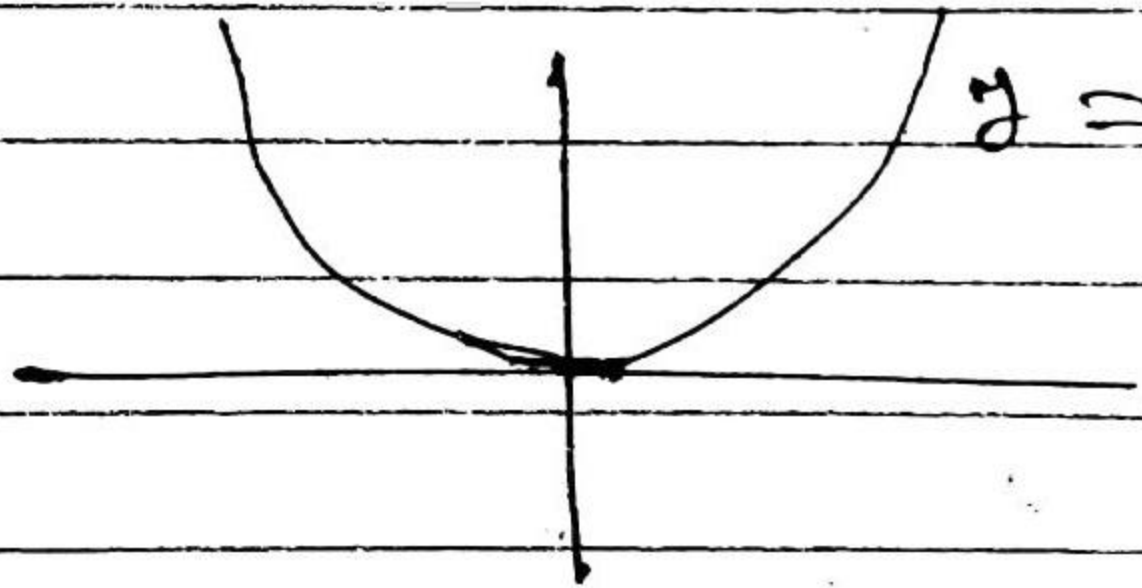
(d)



Ans. a

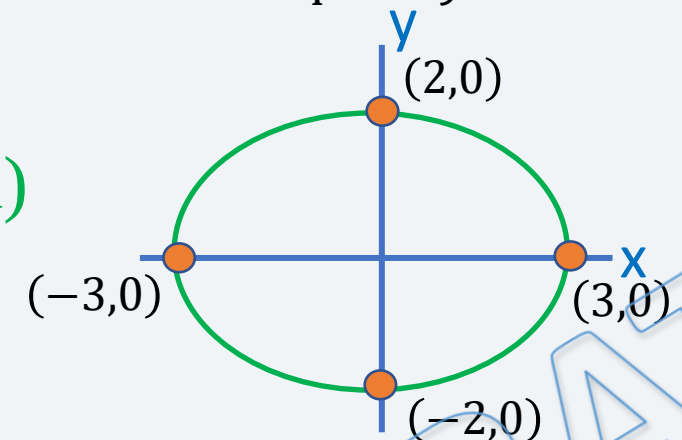
$y = 3x^2$

equation of parabola opening toward $+y$-axis

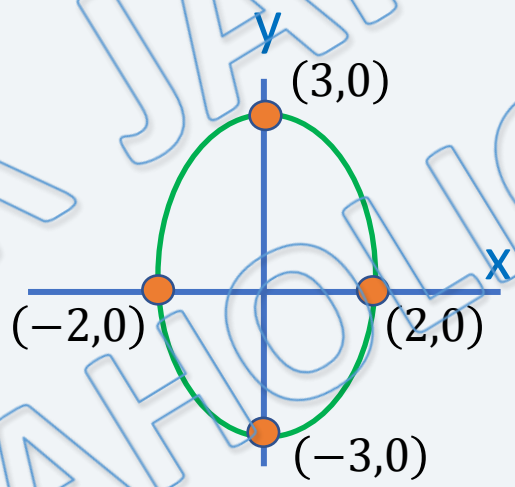


Q) Curve of $\frac{x^2}{4}+\frac{y^2}{9}=1$ is:

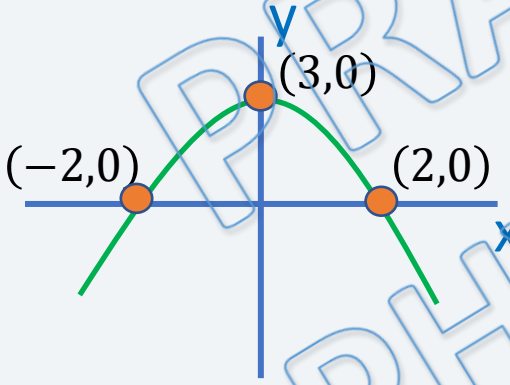
(a)



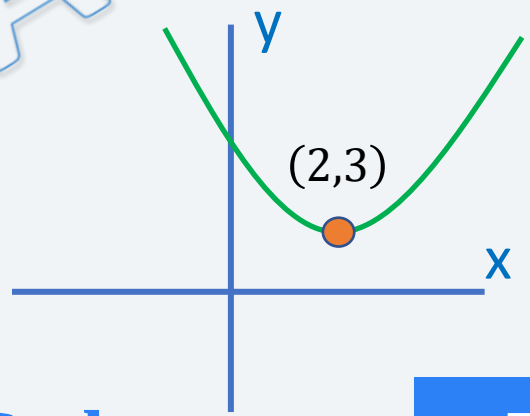
(b)



(c)



(d)



Ans. b

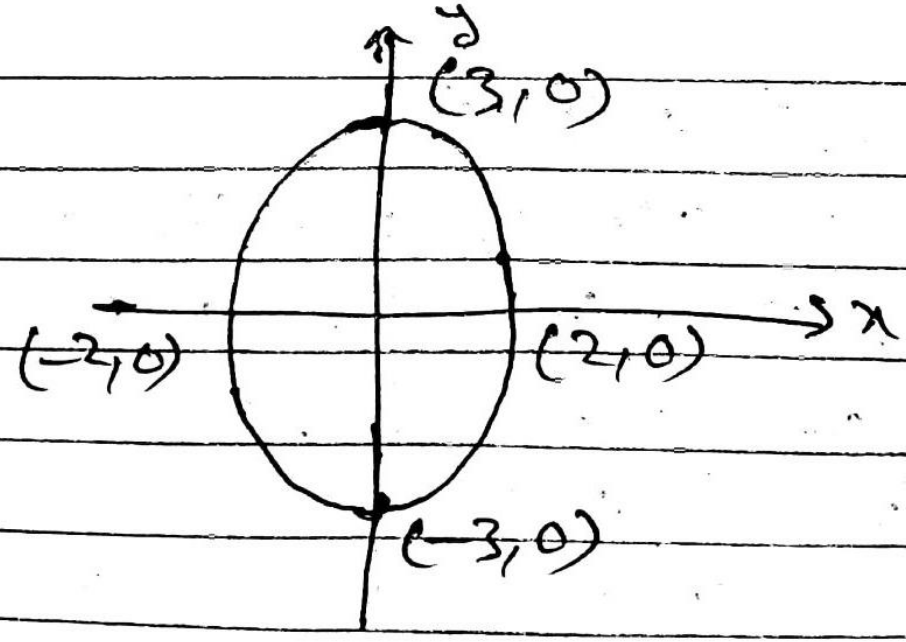
$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

equation of Ellipse:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$a^2 = 4 \Rightarrow a = \pm\sqrt{4} = \pm 2$

$b^2 = 9 \Rightarrow b = \pm\sqrt{9} = \pm 3$



Q) Find radius r and coordinate of centre C of the circle $(x-3)^2+y^2=4$:

(a) $r=2\,unit, C(0,3)$

(b) $r=4\,unit, C(3,0)$

(c) $r=2\,unit, C(3,0)$

(d) $r=2\,unit, C(-3,0)$

Ans. c

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

Compare with standard equation of circle: $(x-a)^2 + (y-b)^2 = r^2$

$a = 3, \quad b = 0, \quad r^2 = 4$

$\therefore$ Centre: $C(3, 0)$

radius: $r = 2$ unit

Q) Which of the following is an equation of hyperbola:

(a) $xy = 1$

(b) $\frac{x^2}{a} - \frac{y^2}{b} = 1$

(c) $\frac{y^2}{a} - \frac{x^2}{b} = 1$

(d) All of these

Ans. d

Standard Equation of Hyperbola:

$xy = c$ and $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

and $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

$\therefore$ (a) $xy = 1$

(b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

(c) $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

all are equations of Hyperbola.

Q) Equation of circle which has radius 4 unit and centre is C(-1,3):

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

(b) $(x+1)^2+(y-3)^2=16$

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

(d) None of these

Ans. b

c $(-1, 3) \equiv (a, b)$

$a = -1, \quad b = 3$

radius, $r =$ 4 unit

Standard equation of circle:

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

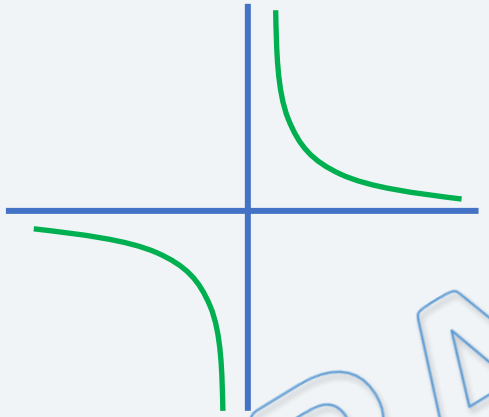
$$(x-(-1))^2 + (y-3)^2 = 4^2$$

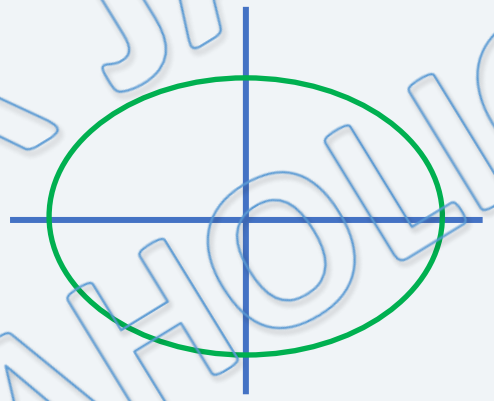
$$(x+1)^2 + (y-3)^2 = 4^2$$

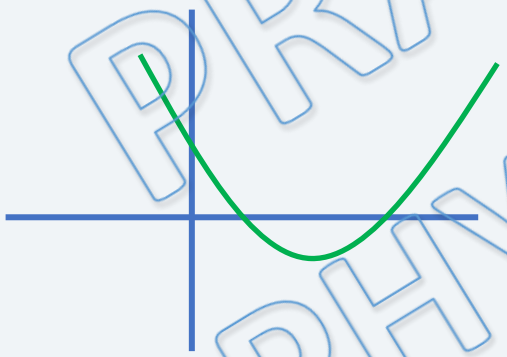
or

$$(x+1)^2 + (y-3)^2 = 16$$

Q) Curve of hyperbola is:

(a) 

(b) 

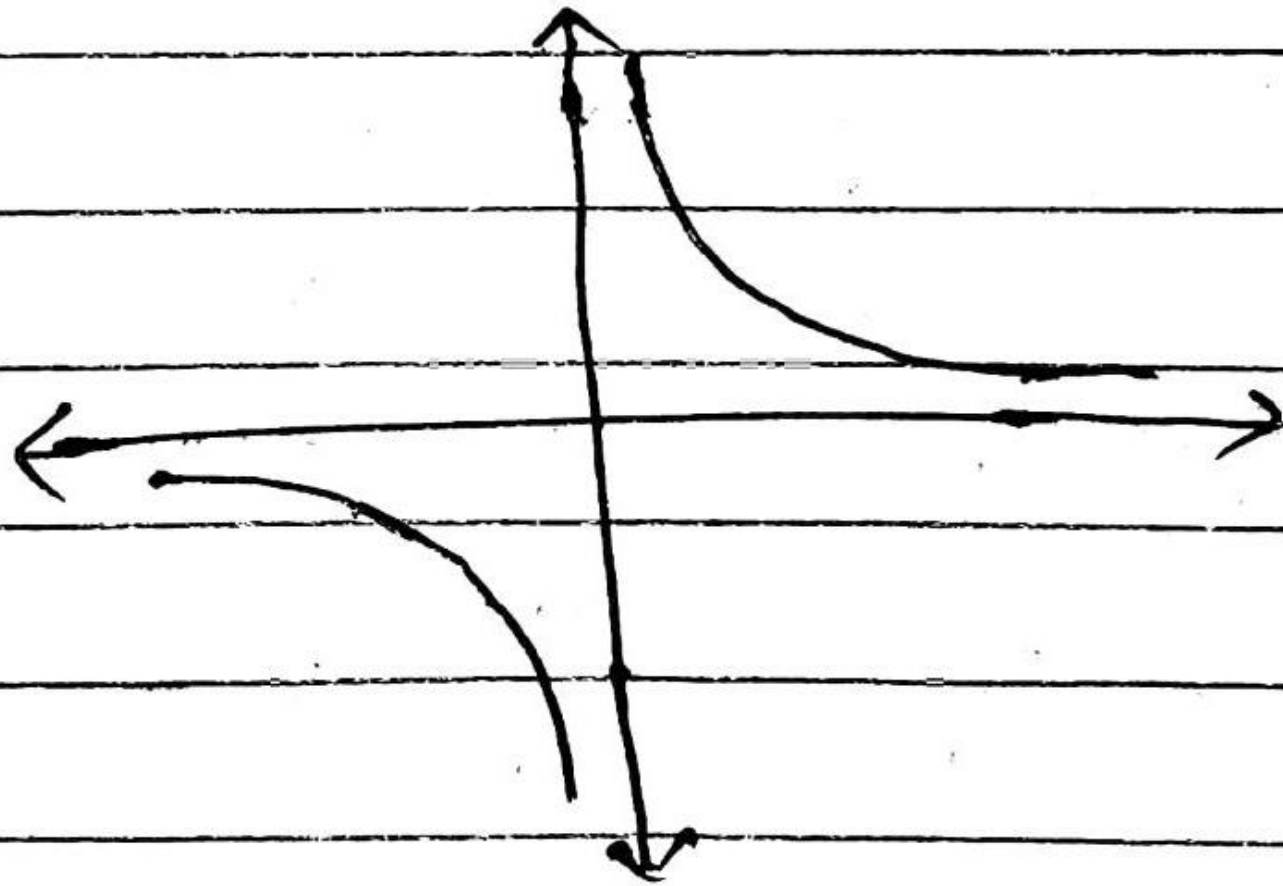
(c) 

(d) None of these

Ans. a

Hyperbola :

$xy = c$.



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