

NDA 2 2024

LIVE

MATHS

REVISION

CLASS 4



NAVJYOTI SIR



07 August 2024 Live Classes Schedule

8:00AM --- 07 AUGUST 2024 DAILY CURRENT AFFAIRS --- RUBY MA'AM

9:00AM --- 07 AUGUST 2024 DAILY DEFENCE UPDATES --- DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:00AM --- INTRODUCTION OF PPDT & PRACTICE --- ANURADHA MA'AM

AFCAT 2 2024 LIVE CLASSES

1:00PM --- MAHA MARATHON SESSION - PART 3

NDA 2 2024 LIVE CLASSES

11:00AM --- GK - HISTORY REVISION - CLASS 2 --- RUBY MA'AM

12:00PM --- PHYSICS REVISION - CLASS 2 --- NAVJYOTI SIR

1:00PM --- MATHS REVISION - CLASS 3 --- NAVJYOTI SIR

2:00PM --- BIOLOGY REVISION - CLASS 3 --- SHIVANGI MA'AM

CDS 2 2024 LIVE CLASSES

11:00AM --- GK - HISTORY REVISION - CLASS 3 --- RUBY MA'AM

12:00PM --- PHYSICS REVISION - CLASS 3 --- NAVJYOTI SIR

2:00PM --- BIOLOGY REVISION - CLASS 3 --- SHIVANGI MA'AM

3:00PM --- MATHS REVISION - CLASS 3 --- NAVJYOTI SIR



REVISION TOPICS :

- **2D Geometry**

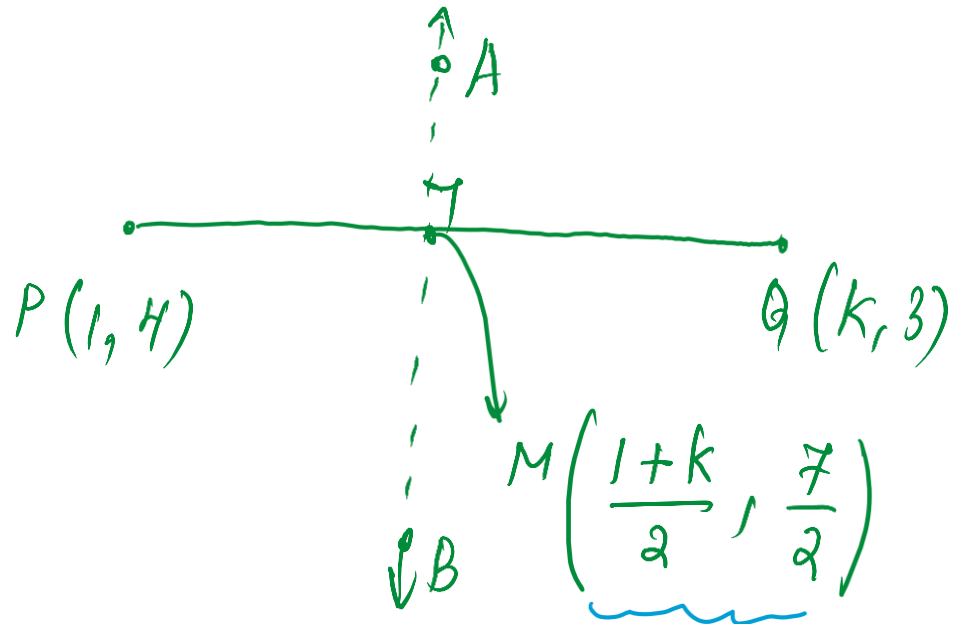
straight lines

circle, parabola

ellipse, hyperbola

Q) The perpendicular bisector of the line segment joining P (1, 4) and Q(k, 3) has y-intercept -4. Then a possible value of k is

- (a) 1 (b) 2 (c) -2 (d) -4



$$\text{slope of } PQ = \frac{3-4}{k-1} = \frac{-1}{k-1}$$

$$\text{slope of } AB = \frac{-1}{\left(\frac{-1}{k-1}\right)} = \underline{k-1}$$

eqn of line, $y = mx + c$

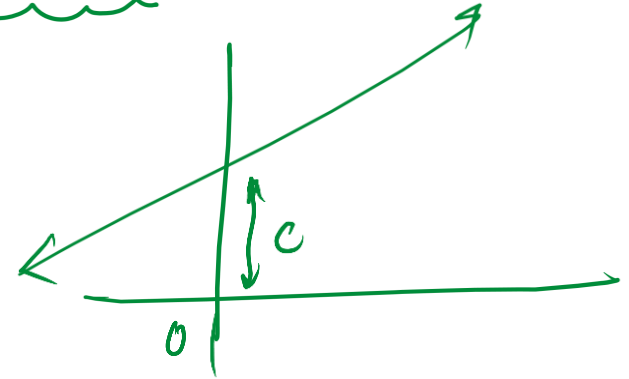
x and y are coordinates on line,

$$y = mx + c$$

slope

y -intercept

$$\frac{7}{2} = (k-1) \left(\frac{1+k}{2} \right) - 4$$



1, 2, -2, -4

$$7 = (k-1)(k+1) - 8$$

$$15 = k^2 - 1$$

$$k^2 = 16$$

Q) The perpendicular bisector of the line segment joining P (1, 4) and Q(k, 3) has y-intercept -4 . Then a possible value of k is

- (a) 1 (b) 2 (c) -2 (d) -4

Ans: (d)

Q) The centres of those circles which touch the circle, $x^2 + y^2 - 8x - 8y - 4 = 0$, externally and also touch the x-axis, lie on:

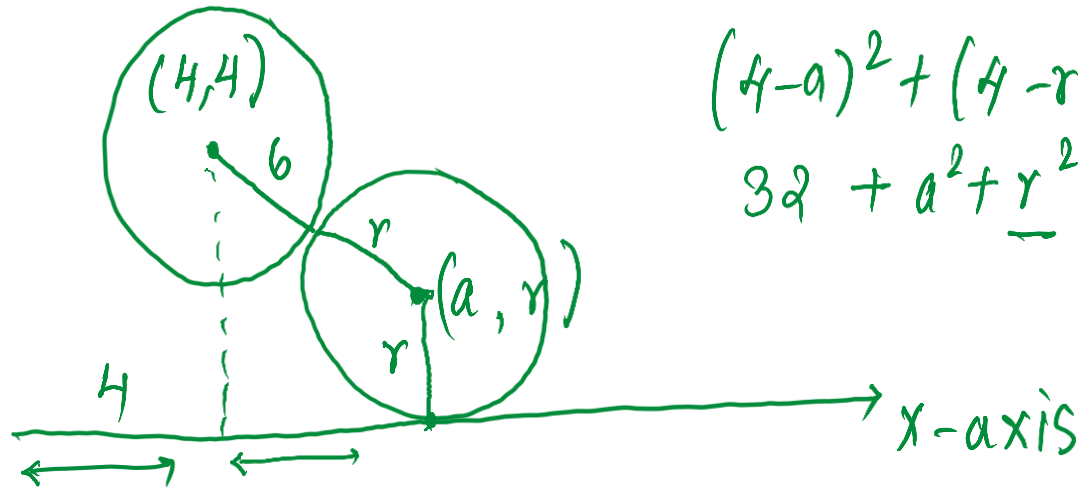
- (a) a hyperbola
- (b) a parabola
- (c) a circle
- (d) an ellipse which is not a circle

$$x^2 + y^2 + 2gx + 2fy + c = 0$$

centre $\rightarrow (-g, -f) \equiv (4, 4)$

radius $\rightarrow \sqrt{g^2 + f^2 - c} = \sqrt{32 + 4} = \sqrt{36} = 6$

$$\left\{ \begin{aligned} x^2 - 8x &= 4 + 8y \\ (x-4)^2 &= 20 + 8y \\ x^2 &= 4ay \end{aligned} \right.$$



$$(4-a)^2 + (4-r)^2 = (6+r)^2$$

$$32 + a^2 + r^2 - 8a - 8r = 36 + r^2 + 12r$$

$$a^2 - 8a - 8r = 4$$

$$\underline{a^2 - 8a} = \underline{4 + 8r}$$

- Q)** The centres of those circles which touch the circle,
 $x^2 + y^2 - 8x - 8y - 4 = 0$, externally and also touch the x-axis,
lie on:
- (a) a hyperbola
 - (b) a parabola
 - (c) a circle
 - (d) an ellipse which is not a circle

Ans: (b)

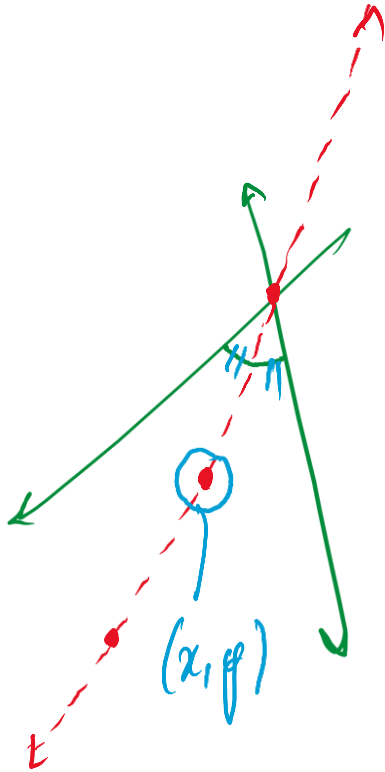
Q) The bisector of the acute angle between the straight lines $3x - 4y - 3 = 0$ and $12x + 5y + 6 = 0$ passes through which one of the following points ?

(a) $(5, 3)$

(c) $(2, 7)$

(b) $(-3, 6)$

(d) $(-1, 4)$



$$3x - 4y - 3 = 0 \quad \curvearrowright \quad m = \frac{3}{4}$$

$$12x + 5y + 6 = 0 \quad \curvearrowright \quad m = -\frac{12}{5}$$

Q) The bisector of the acute angle between the straight lines $3x - 4y - 3 = 0$ and $12x + 5y + 6 = 0$ passes through which one of the following points ?

(a) (5, 3)

(b) (-3, 6)

(c) (2, 7)

(d) (-1, 4)

Ans: (c)

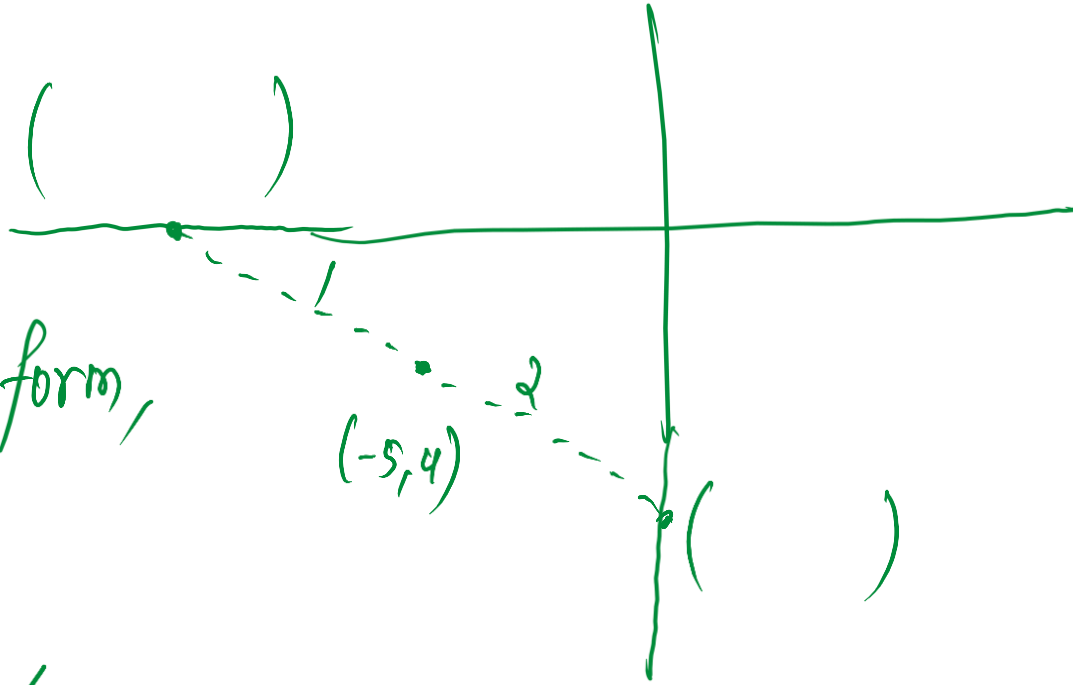
Q) If $(-5, 4)$ divides the line segment between the coordinate axes in the ratio 1:2, then what is its equation?

- (a) $8x + 5y + 20 = 0$ (b) $5x + 8y - 7 = 0$
 (c) $8x - 5y + 60 = 0$ (d) $5x - 8y + 57 = 0$

Section formula,

straight line in intercept form,

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



Q) If $(-5, 4)$ divides the line segment between the coordinate axes in the ratio $1:2$, then what is its equation?

(a) $8x + 5y + 20 = 0$

(b) $5x + 8y - 7 = 0$

(c) $8x - 5y + 60 = 0$

(d) $5x - 8y + 57 = 0$

Ans: (c)

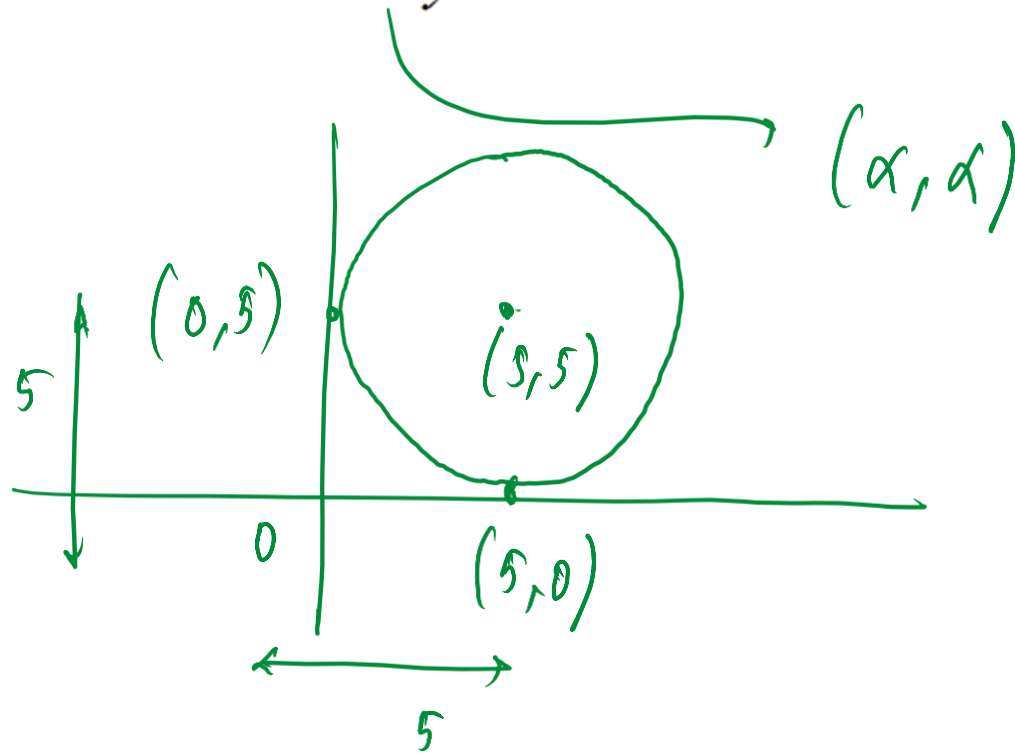
Q) The equation of the circle which touches the axes at a distance 5 from the origin is $y^2 + x^2 - 2\alpha x - 2\alpha y + \alpha^2 = 0$.
What is the value of α ?

(a) 4

(b) 5

(c) 6

(d) 7



Q) The equation of the circle which touches the axes at a distance 5 from the origin is $y^2 + x^2 - 2\alpha x - 2\alpha y + \alpha^2 = 0$.
What is the value of α ?

- (a) 4 (b) 5
(c) 6 (d) 7

Ans: (b)

Q) What does the equation $x^3y + xy^3 - xy = 0$ represent?

- (a) A pair of straight lines only
- (b) A pair of straight lines and a circle
- (c) A rectangular hyperbola only
- (d) A rectangular hyperbola and a circle

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

$xy = 0$
↓
pair of straight line

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

circle

Q) What does the equation $x^3y + xy^3 - xy = 0$ represent?

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Ans: (b)

Q) Let E be the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and C be the circle $x^2 + y^2 = 9$. Let $P = (1, 2)$ and $Q = (2, 1)$. Which one of the following is correct?

- (a) Q lies inside C but outside E
- (b) Q lies outside both C and E
- (c) P lies inside both C and E
- (d) P lies inside C but outside E .

P, Q (inside)

put points in LHS of ellipse and circle eqn and check.

$= 1$ (on ellipse)
 < 1 (inside ellipse)
 > 1 (outside ellipse)

$= 9$ (on circle)
 < 9 (inside circle)
 > 9 (outside circle)

Q inside
 P outside

Q) Let E be the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and C be the circle $x^2 + y^2 = 9$. Let $P = (1, 2)$ and $Q = (2, 1)$. Which one of the following is correct?

- (a) Q lies inside C but outside E
- (b) Q lies outside both C and E
- (c) P lies inside both C and E
- (d) P lies inside C but outside E .

Ans: (d)

$(-g, -f)$

Q) If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ ($c > 0$) touches the y-axis, then which one of the following is correct?

(a) $g = -\sqrt{c}$ only

(b) $g = \pm\sqrt{c}$

(c) $f = \sqrt{c}$ only

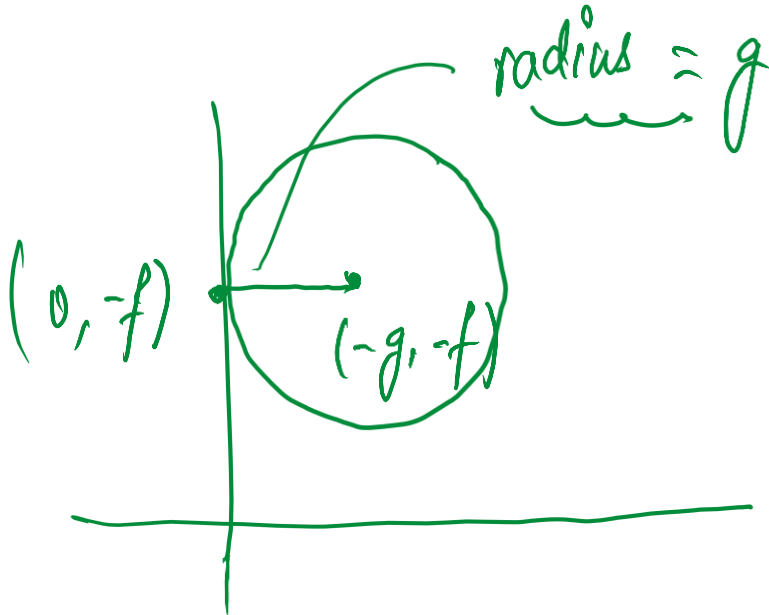
(d) $f = \pm\sqrt{c}$

$$\sqrt{g^2 + f^2 - c} = g$$

$$g^2 + f^2 - c = g^2$$

$$f^2 = c$$

$$f = \pm\sqrt{c}$$



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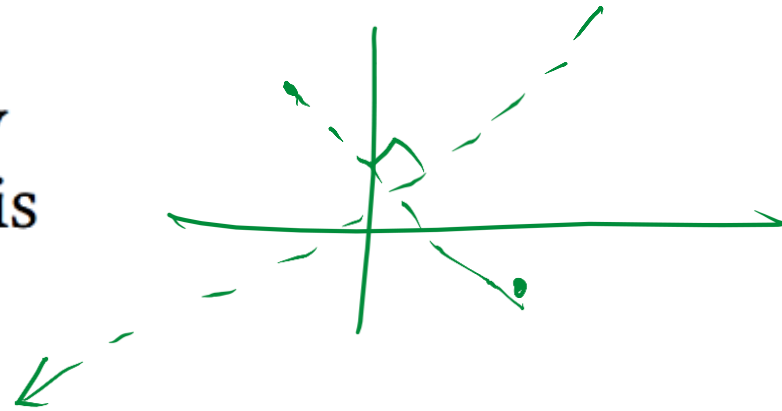
(c) $f = \sqrt{c}$ only

(d) $f = \pm\sqrt{c}$

Ans: (d)

Q) If the image of the point $(-4, 2)$ by a line mirror is $(4, -2)$, then what is the equation of the line mirror?

- (a) $y = x$ (b) $y = 2x$
 (c) $4y = x$ (d) $y = 4x$

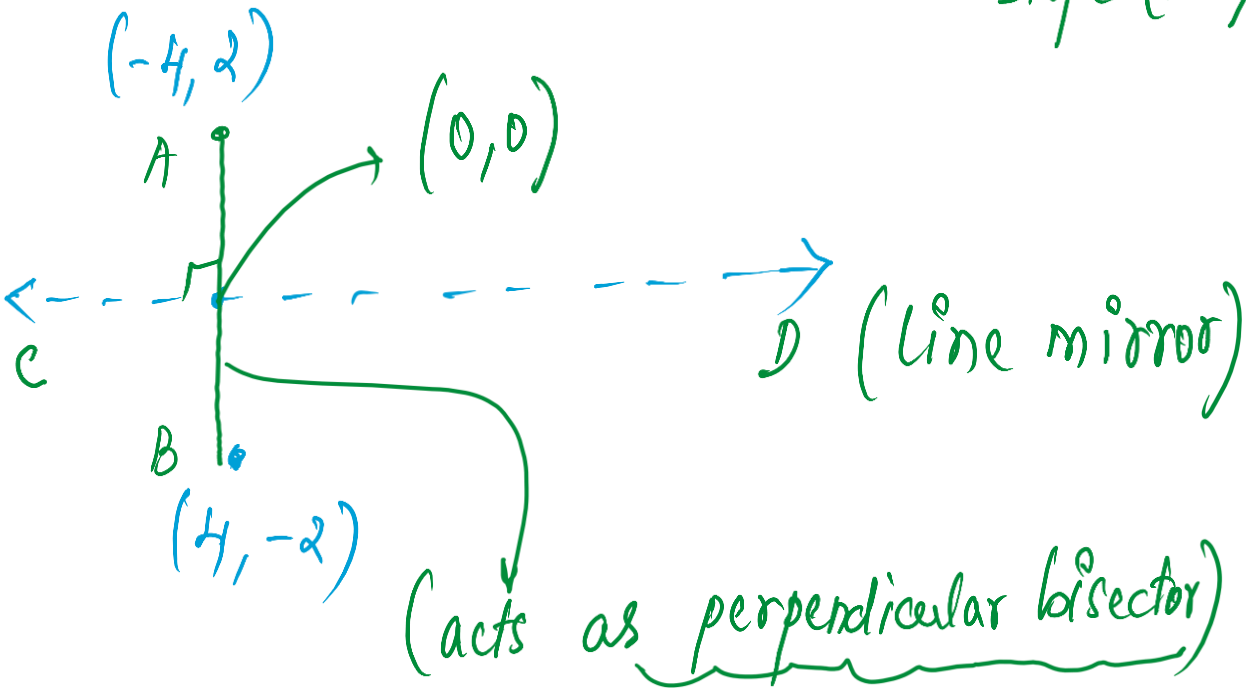


$$\text{slope (AB)} = \frac{-4}{8} = -\frac{1}{2}$$

$$\text{slope (CD)} = 2 \text{ (-ve reciprocal)}$$

$$y - 0 = 2(x - 0)$$

$$y = 2x$$



Q) If the image of the point $(-4, 2)$ by a line mirror is $(4, -2)$, then what is the equation of the line mirror?

- (a) $y = x$ (b) $y = 2x$
(c) $4y = x$ (d) $y = 4x$

Ans: (b)

Q) The difference of focal distances of any point on a hyperbola is equal to

- | | |
|---------------------|--------------------------|
| (a) latus rectum | (b) semi-transverse axis |
| (c) transverse axis | (d) semi-latus rectum |

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- | | |
|---------------------|--------------------------|
| (a) latus rectum | (b) semi-transverse axis |
| (c) transverse axis | (d) semi-latus rectum |

Ans: (c)

Q) The two circles touch each other if

(a) $c = \sqrt{a^2 + b^2}$

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

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

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

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

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

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

Ans: (b)

NDA 2 2024

LIVE

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CLASS 5



NAVJYOTI SIR

**REVISION
TOPICS :
(09/08/24)**

- **3D and Vector Algebra**