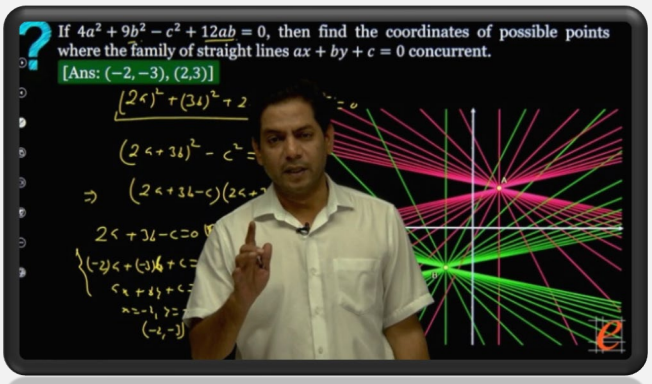
Course Brochure

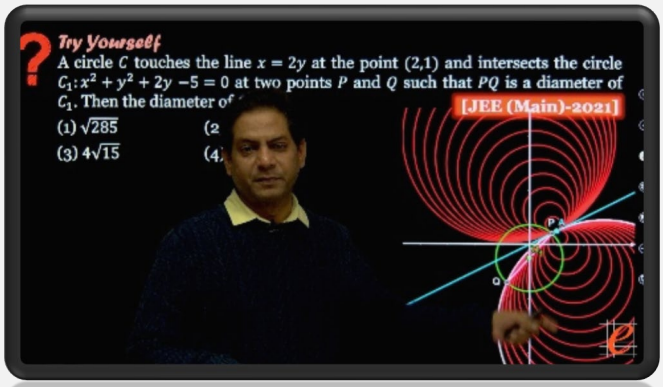
Coordinate Geometry for JEE Main and Advanced

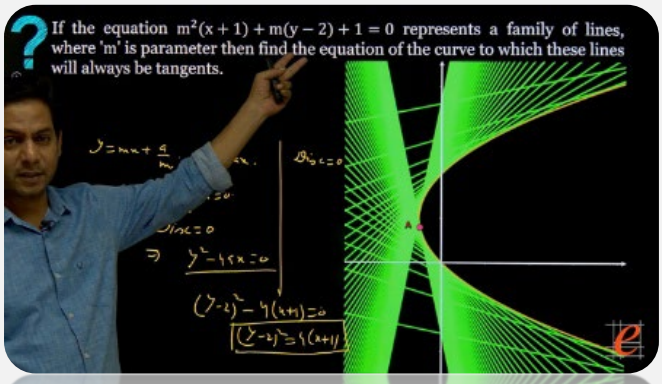
[*With focus on Problem Solving Skills*]

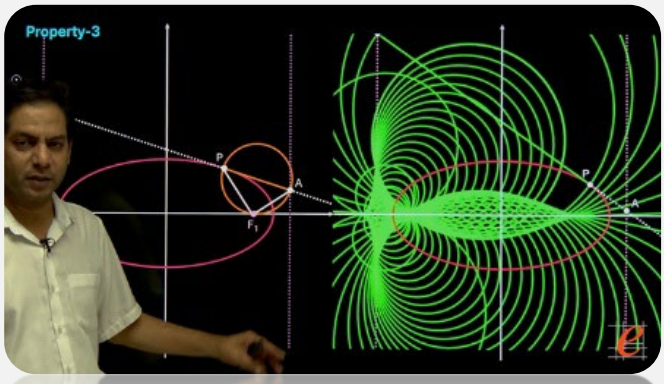
Yogesh Goyal

[B.Tech. IIT Kanpur. 20+ Yrs, Exp]









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The teacher

Yogesh Goyal is an IIT Kanpur alumnus (B. Tech.) with over two decades of experience in teaching, academic planning, and content development for competitive examinations such as JEE and NEET. He has worked in senior academic roles with reputed institutions across India and has been deeply involved in student mentoring, faculty training, national-level content creation, and the design of large-scale academic programs. He formally stepped away from institutional roles in June 2025 to focus entirely on building EduCanvas.

His work has always gone beyond classroom teaching. With a strong interest in visual pedagogy, data visualization, and structured content design, he has consistently explored how learning becomes clearer when concepts are supported by intelligent visuals, precise sequencing, and reduced cognitive load. This combination of subject expertise and learning design thinking forms the foundation of his academic philosophy.

EduCanvas represents his vision of transforming recorded education from simple video delivery into a scientifically designed learning system. He believes that great teaching achieves its full impact only when supported by strong learning architecture. Through EduCanvas, he aims to create courses where clarity, structure, and cognitive efficiency guide every aspect of the student's learning experience.

The Course

Coordinate Geometry is one of the most scoring and conceptually important areas of JEE Main and JEE Advanced. A strong command over this section forms the foundation for solving a wide range of problems involving straight lines and conic sections with speed, accuracy, and confidence.

The **Coordinate Geometry** course by **EduCanvas** is a comprehensive learning system that combines **Straight Lines, Circles, Parabola, Ellipse, and Hyperbola** into one structured program. Rather than treating these chapters as isolated topics, the course develops them as interconnected concepts, helping students build a deep and unified understanding of coordinate geometry.

Designed specifically for recorded learning, every concept is presented through carefully planned visual explanations, animated diagrams, structured problem-solving, and extensive guided practice. Students learn not only how to apply formulas but also the geometric intuition behind them, enabling them to solve JEE-level problems with greater confidence and efficiency.

Duration: 68 Hrs

Number of Lecture Practice Sheets: 46

Number of problems for Practice (with solutions): 930

Number of problems/examples solved fully by teacher: 363

Number of problems explained by teacher and left to students to get final answer i.e. Try Yourself: 220

How the Course Is Structured

The course consists of **32 comprehensive lectures**; each recorded with a duration of about **2 to 3 hours duration**. For better learning and easier viewing, each lecture is presented in the **EduCanvas App in two-three parts of approximately one hour each**.

This structure allows students to learn in focused sessions while maintaining continuity of the concept flow.

The lectures cover the complete theory of Straight Lines, Circles, Parabola, Ellipse and Hyperbola required for **JEE Main and Advanced**, beginning from geometric foundations and gradually progressing to advanced topics in each topic

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Teaching Approach

All lectures are taught on a **digital board using carefully designed animated PPTs** that help students visualize mathematical ideas clearly.

Instead of long static writing on the board, concepts are explained using:

- structured diagrams
- step-by-step visual development
- animated illustrations
- clear highlighting of key ideas

This visual approach helps students **understand concepts faster and remember them longer**.

During each lecture, around **12–20 carefully selected illustrations** are solved completely, allowing students to see how concepts are applied in real problems.

In addition, **10-12 problems in every lecture are explained partially**, where the approach and strategy are discussed and students are encouraged to complete the solution themselves. This ensures that students actively engage with the concept rather than passively watching the lecture.

Lecture Practice Problems (LPP)

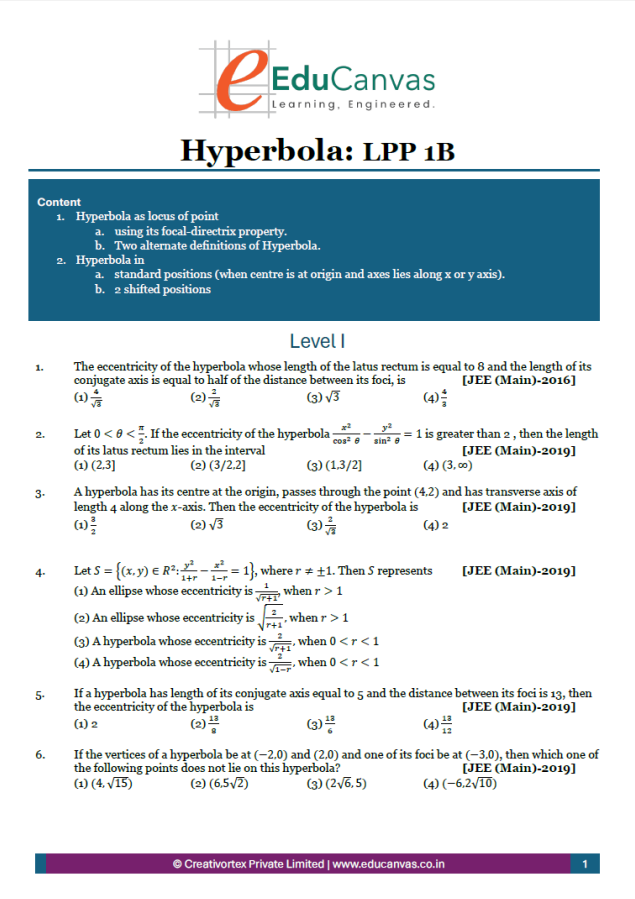
Practice is an essential part of mastering coordinate geometry. For this reason, every lecture is accompanied by **Lecture Practice Problems (LPP)**.

Each LPP contains approximately **20–25 carefully selected problems** based on the concepts covered in that lecture.

These problems help students:

- strengthen conceptual understanding
- develop problem-solving strategies
- build exam-level confidence

Detailed **solutions to all LPP questions are provided separately in PDF format**. Both the problem set and the solution PDF are available inside the **EduCanvas App** for easy access.



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Hyperbola: LPP 1B

Content

1. Hyperbola as locus of point
   a. using its focal-directrix property.
   b. Two alternate definitions of Hyperbola.
2. Hyperbola in
   a. standard positions (when centre is at origin and axes lies along x or y axis).
   b. 2 shifted positions

Level I

1. The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is **[JEE (Main)-2016]**
   (1) $\frac{4}{\sqrt{3}}$ (2) $\frac{2}{\sqrt{3}}$ (3) $\sqrt{3}$ (4) $\frac{4}{3}$

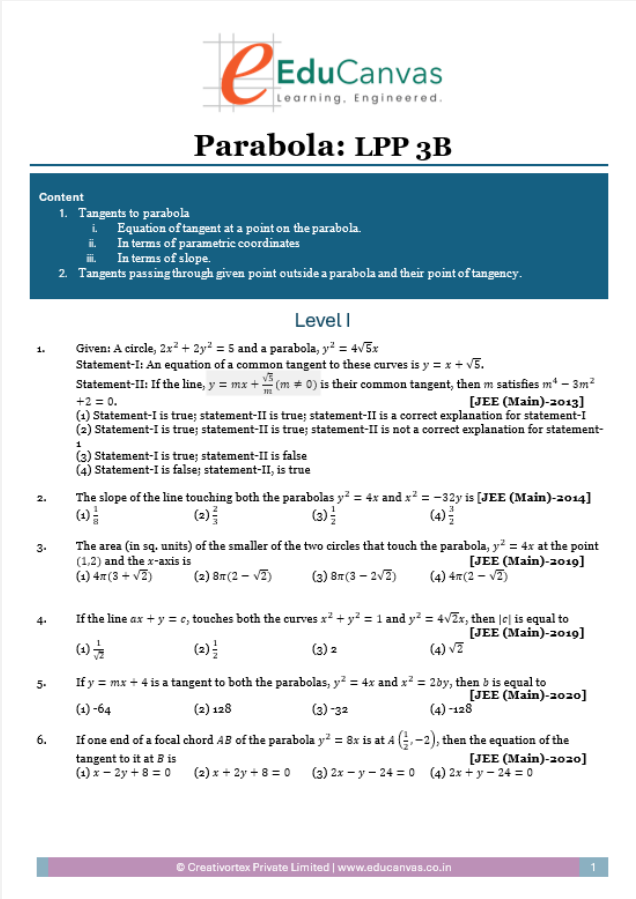
2. Let $0 < \theta < \frac{\pi}{2}$. If the eccentricity of the hyperbola $\frac{x^2}{\cos^2\theta} - \frac{y^2}{\sin^2\theta} = 1$ is greater than 2 , then the length of its latus rectum lies in the interval **[JEE (Main)-2019]**
   (1) (2,3] (2) (3/2,2] (3) (1,3/2] (4) $(3, \infty)$

3. A hyperbola has its centre at the origin, passes through the point (4,2) and has transverse axis of length 4 along the x-axis. Then the eccentricity of the hyperbola is **[JEE (Main)-2019]**
   (1) $\frac{3}{2}$ (2) $\sqrt{3}$ (3) $\frac{2}{\sqrt{3}}$ (4) 2

4. Let $S = \left\{(x, y) \in R^2 : \frac{y^2}{1+r} - \frac{x^2}{1-r} = 1\right\}$, where $r \neq \pm 1$. Then S represents **[JEE (Main)-2019]**
   (1) An ellipse whose eccentricity is $\frac{1}{\sqrt{r+1}}$, when $r > 1$
   (2) An ellipse whose eccentricity is $\sqrt{\frac{2}{r+1}}$, when $r > 1$
   (3) A hyperbola whose eccentricity is $\frac{2}{\sqrt{r+1}}$, when $0 < r < 1$
   (4) A hyperbola whose eccentricity is $\frac{2}{\sqrt{1-r}}$, when $0 < r < 1$

5. If a hyperbola has length of its conjugate axis equal to 5 and the distance between its foci is 13, then the eccentricity of the hyperbola is **[JEE (Main)-2019]**
   (1) 2 (2) $\frac{13}{8}$ (3) $\frac{13}{6}$ (4) $\frac{13}{12}$

6. If the vertices of a hyperbola be at (−2,0) and (2,0) and one of its foci be at (−3,0), then which one of the following points does not lie on this hyperbola? **[JEE (Main)-2019]**
   (1) $(4, \sqrt{15})$ (2) $(6.5\sqrt{2})$ (3) $(2\sqrt{6}, 5)$ (4) $(-6, 2\sqrt{10})$



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Parabola: LPP 3B

Content

1. Tangents to parabola
   i. Equation of tangent at a point on the parabola.
   ii. In terms of parametric coordinates
   iii. In terms of slope.
2. Tangents passing through given point outside a parabola and their point of tangency.

Level I

1. Given: A circle, $2x^2 + 2y^2 = 5$ and a parabola, $y^2 = 4\sqrt{5}x$
   Statement-I: An equation of a common tangent to these curves is $y = x + \sqrt{5}$.
   Statement-II: If the line, $y = mx + \frac{\sqrt{5}}{m}(m \neq 0)$ is their common tangent, then m satisfies $m^4 - 3m^2 + 2 = 0$. **[JEE (Main)-2013]**
   (1) Statement-I is true; statement-II is true; statement-II is a correct explanation for statement-I
   (2) Statement-I is true; statement-II is true; statement-II is not a correct explanation for statement-I
   (3) Statement-I is true; statement-II is false
   (4) Statement-I is false; statement-II, is true

2. The slope of the line touching both the parabolas $y^2 = 4x$ and $x^2 = -32y$ is **[JEE (Main)-2014]**
   (1) $\frac{1}{8}$ (2) $\frac{2}{3}$ (3) $\frac{1}{2}$ (4) $\frac{3}{2}$

3. The area (in sq. units) of the smaller of the two circles that touch the parabola, $y^2 = 4x$ at the point (1,2) and the x-axis is **[JEE (Main)-2019]**
   (1) $4\pi(3 + \sqrt{2})$ (2) $8\pi(2 - \sqrt{2})$ (3) $8\pi(3 - 2\sqrt{2})$ (4) $4\pi(2 - \sqrt{2})$

4. If the line $ax + y = c$, touches both the curves $x^2 + y^2 = 1$ and $y^2 = 4\sqrt{2}x$, then $|c|$ is equal to **[JEE (Main)-2019]**
   (1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$ (3) 2 (4) $\sqrt{2}$

5. If $y = mx + 4$ is a tangent to both the parabolas, $y^2 = 4x$ and $x^2 = 2by$, then b is equal to **[JEE (Main)-2020]**
   (1) -64 (2) 128 (3) -32 (4) -128

6. If one end of a focal chord AB of the parabola $y^2 = 8x$ is at $A\left(\frac{1}{2}, -2\right)$, then the equation of the tangent to it at B is **[JEE (Main)-2020]**
   (1) $x - 2y + 8 = 0$ (2) $x + 2y + 8 = 0$ (3) $2x - y - 24 = 0$ (4) $2x + y - 24 = 0$

Topics Covered in the Course

The complete lecture plans for each topic are given below

Straight Lines

Lecture 1

1. Distance formula
2. Section formula:
    i. internal and external division
3. Centres of triangle
    i. Centroid,
    ii. Incentre & Ex-centres
    iii. Orthocentre
    iv. Circumcentre
4. Area of triangle
    i. Area of any polygon.
    ii. Area = 0 implies collinearity.

Lecture 2

1. Concept of locus
2. Inclination and slope of line
3. Equation of line when different type of information is available about line
    i. Two points on a line are known
    ii. Intercepts (?) on x and y axis are known
    iii. Slope of line and a point on it is known
    iv. General form of equation of line
4. Inter conversion in different forms (wherever possible)
5. Point of intersection and concurrency of three lines
6. Angle between two lines, conditions for two lines being parallel and perpendicular.

Lecture 3

1. Equation of line (special cases)
    i. Normal form / conversion to this form
    ii. Parametric form (Problems involving distances on a line from a point on that line)
    iii. Equation of line in determinant form
2. Two lines passing through a given point making equal angle with a given line (there slopes and hence equation.
3. Foot of perpendicular & Reflection
4. Position of points w.r.t. a given line
    i. Point lies inside a triangle or any given polygon
    ii. Foot of perpendicular and reflection of a point in given line

Lecture 4

1. Perpendicular distance of point from line
2. Bisectors of angle between two lines
    i. Identifying the bisector of part containing origin or any given point in general
    ii. Identifying the bisectors of acute or obtuse angle between lines precisely
    iii. Bisectors expressed in parametric form
    iv. Identifying the bisectors of angles of a triangle i.e. internal or external, precisely

3. Family of lines
    i. Parallel and perpendicular to given line
    ii. Passing through point of intersection of two given lines
    iii. Miscellaneous Families (getting diagonals of a parallelogram

Lecture 5

1. General equation of Pair of lines
    i. Passing through origin or in general (Second degree homogeneous or non-homogeneous equations i.e., SDHE & SDNHE)
    ii. Condition for SDHE & SDNHE to represent pair of lines
    iii. Method to separate the line in both cases (in general avoid it)
    iv. Finding point of intersection w/o separating the lines
2. Relations between slopes of lines and coefficients of SDHE or SDNHE
    i. Angle between pair of lines
    ii. Conditions for being parallel/coincident and perpendicular

Lecture 6

1. Combined equation of bisectors of angle between the lines
2. Concept of homogenization and its applications in problems
3. Transformation of axis
    i. Shifting origin but no rotation (useful)
    ii. Rotation of axis (rarely used)

Circles

Lecture 01

1. Brief review of pure Geometry involving circles
    i. Geometrical properties of circle
    ii. Properties involving tangents to a circle
    iii. Properties of cyclic quadrilaterals.
2. Definition of circle as locus in two ways
    i. locus of a point which is always at fixed distance from a given point
    ii. Apollonius definition with its proof.
    iii. Finding equation of circle when its center & radius is known with stress on using pure geometry in finding center & radius.

Lecture 02

1. Equation of circle
    i. In general form from center –radius definition
    ii. Equation of circle in diametric form
    iii. Parametric equation of circle.
    iv. Equation of chord joining two points on circle in parametric form.

Lecture 03

1. Position of a point w.r.t. a circle (inside, outside or on).
2. Intercepts
    i. Position of Axes w.r.t. given circle
    ii. Position of any linew.r.t. circle
    iii. lengths of intercepts made on axes & in general on any line
    iv. Chord with a given point as mid-point

Lecture 04

1. Tangents at a point on circle
    i. Concept of tangent to a general curve.
    ii. Equation of tangent at a given point on a circle (justify T = 0)
    iii. Tangent with a given slope & its general equation for circle with center at origin
    iv. Tangent at point in parametric form
    v. Point of intersection of two tangents
2. Tangents from outside
    i. Two tangents from a point outside the circle & finding their equations
    ii. Finding point of tangency of any tangent
    iii. Length of tangents
    iv. Power of a point

Lecture 05

1. Tangents from outside
    i. Chord of contact
    ii. Various results and important points regarding the figure formed by the two tangents from a point & their chord of contact
    iii. Combined equation of two tangents from a point outside the circle
    iv. Director circle and similar locus based on angle between tangents

Lecture 06

1. Family of circles
    i. passing through point of intersection of two circles
    ii. passing through point of intersection of a circle and a line
    iii. passing through two given points
    iv. touching a given line at a given point on it
    v. miscellaneous families

Lecture 07

1. Circles and common tangents
    i. Relative positions of two circles
    ii. Number of common tangents to two circles
    iii. Finding the equations of common tangents
    iv. Finding the lengths of common tangents.

Lecture 08

1. Radical axes / common chord
    i. its location & other properties. Radical centre.
2. Angle of intersection of two curves in general and circle as a special case.
    i. Orthogonality of two circles.
    ii. Orthogonality of three circles

Parabola

Lecture 01

3. Introduction
    i. Conic sections as the curves obtained by cutting a cone by a plane at different angles.
    ii. Conic sections as locus of point using their focal-directrix property, covering both the cases when focus lies on the directrix and when it is separated.

4. Parabola in standard and shifted positions
    i. when vertex is at origin and axis lies along x or y axis
    ii. when parabola has its vertex at (a, b) and axis is parallel to x or y axis
5. Finding the components of parabola when its equation is given
6. Finding the equation when some of its components are given.

Lecture 02

2. Parametric coordinates
3. Equation of chord joining two points in parametric form & hence property of focal chord.
4. Position of a point w.r.t. parabola.
5. Position of line w.r.t. parabola.
6. Parabola and chords
    i. length of intercept made by parabola on a line.
    ii. length of focal chord.
    iii. focal distance of any point on parabola

Lecture 03

3. Tangents to parabola
    i. Equation of tangent at a point on the parabola.
    ii. In terms of parametric coordinates
    iii. In terms of slope.
4. Tangents passing through given point outside a parabola and their point of tangency.
5. Problems on using the equations of tangents in different forms.

Lecture 04

2. Combined equation of pair of tangents from a point outside a parabola.
3. Properties related to tangents to a parabola.

Lecture 05

2. Chord of contact, its equation and length.
3. Equation of normal at a point on parabola.
    i. Equation of normal in parametric form.
    ii. Equation of normal if slope is known/given.
4. problems on using the equations of normals in different forms.

Lecture 06

2. Properties related to normals & tangents.
3. conormal points etc.
4. System of parallel chords. concept of Diameter and hence centre.
5. Chord with a given point as mid-point.

Ellipse

Lecture 01

1. Ellipse as locus of point
    a. using its focal-directrix property.
    b. Two alternate definitions of ellipse.

2. Ellipse in
    a. standard positions (when centre is at origin and axes lies along x or y axis).
    b. Ellipse in 2 shifted positions (when Ellipse has its vertex at (a, b) and axes are parallel to x or y axis).
3. finding the components of Ellipse when its equation is given
4. Finding the equation when some of its components are given.

Lecture 02

1. Radius vector of any point on ellipse.
2. Auxiliary circle, eccentric angle and hence Parametric coordinates of any point on Ellipse in standard and shifted position.
3. Position of a point w.r.t. Ellipse
4. Ellipse and chords
    a. Equation of chord joining two points, in parametric form.
    b. Focal chord and properties related to it. (2 Properties)
    c. Position of line w.r.t. Ellipse
    d. length of intercept made by Ellipse on a line.

Lecture 03

1. Equation of tangent at a point on the Ellipse.
    a. Cartesian form
    b. Parametric coordinate form.
    c. Equation of a tangent if its slope is known.

Lecture 04

1. Two tangents passing through given point outside an ellipse
    a. their equations
    b. points of tangency.
2. Combined equation of pair of tangents from a point outside an ellipse.
3. Director Circle.
4. Properties related to tangents to an ellipse (5 Properties)

Lecture 05

1. Chord of contact, its equation and length.
2. Equation of normal at a point on ellipse.
    a. Cartesian form
    b. In parametric form.
    c. In slope form

Lecture 06

1. Properties related to normals (2 properties)
2. conormal points etc.
3. System of parallel chords.
    a. Concept of Diameter and hence centre.
    b. Chord with a given point as midpoint.
    c. 2 properties

Hyperbola

Lecture 01

1. Hyperbola as locus of point
    a. using its focal-directrix property.
    b. Two alternate definitions of Hyperbola.
2. Hyperbola in
    a. standard positions (when centre is at origin and axes lies along x or y axis).
    b. Hyperbola in 2 shifted positions (when Hyperbola has its vertex at (a, b) and axes are parallel to x or y axis).
3. finding the components of Hyperbola when its equation is given
4. finding the equation when some of its components are given.

Lecture 02

1. Radius vector of any point on Hyperbola.
2. Auxiliary circle, eccentric angle and hence Parametric coordinates of any point on Hyperbola in standard and shifted position.
3. Position of a point w.r.t hyperbola and chords
    a. Equation of chord joining two points, in parametric form.
    b. Focal chord and properties related to it.
    c. Position of line w.r.t. Hyperbola.
    d. Length of intercept made by Hyperbola on a line.
4. Equation of tangent at a point on the Hyperbola.
    a. Cartesian form
    b. Parametric coordinate form.
    c. Slope form
5. Two tangents passing through given point outside a Hyperbola
    a. Their equations
    b. points of tangency.
6. Director Circle.

Lecture 03

1. Combined equation of pair of tangents from a point outside a Hyperbola.
2. Chord of contact
    a. its equation and length.
3. Equation of normal
    a. at a point on Hyperbola.
    b. in parametric form.
    c. Equation of normal if slope is known/given.
4. Conormal points

Lecture 04

1. Properties related to tangents and normals to a Hyperbola.
2. conormal points etc.
3. System of parallel chords.
    a. concept of Diameter and hence centre.
    b. Chord with a given point as midpoint.

Lecture 05

1. Asymptotes to a Hyperbola.

2. Equation of a Hyperbola, it's Asymptotes and its's Conjugate Hyperbola.
3. Properties related to asymptotes.

Lecture 06

1. Rectangular Hyperbola.
    a. Equations of Rectangular Hyperbola referred to its asymptotes as its axes.
    b. Parametric coordinates on rectangular hyperbola.
    c. equations of tangent & Normals to rectangular Hyperbola.

Who This Course Is For

This course is ideal for students who:

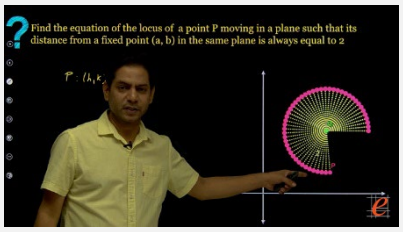
• are preparing for **JEE Main and JEE Advanced**
• want **strong conceptual clarity in coordinate geometry**
• prefer **visual explanations rather than rote formula learning**
• want **structured practice along with theory**

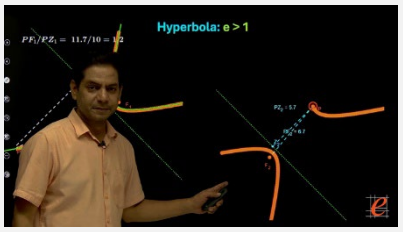
What Students Gain from This Course

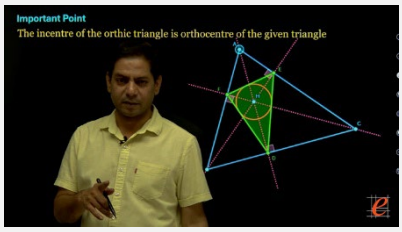
By the end of the course, students will be able to:

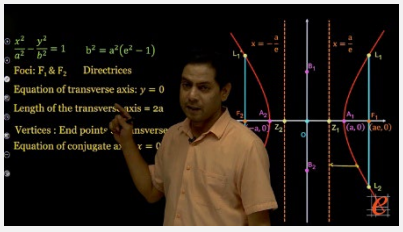
• understand Coordinate Geometry concepts deeply
• approach problems using geometric insight
• solve exam-level questions with confidence
• connect concepts of Coordinate Geometry with other topics of Mathematics

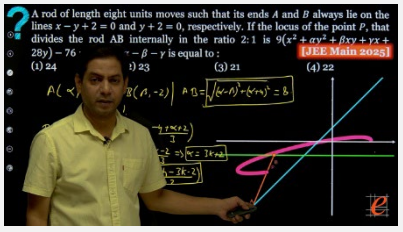
Some Screenshots

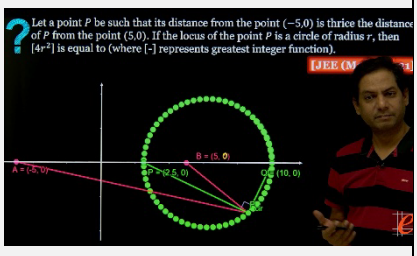


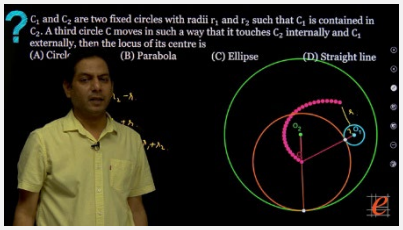


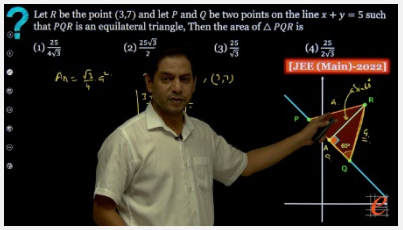


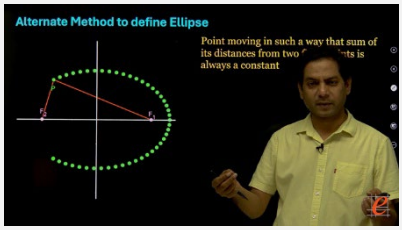


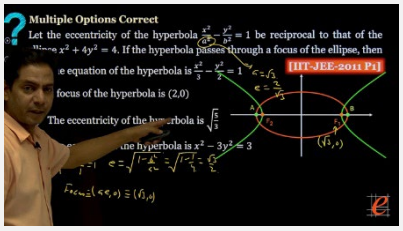


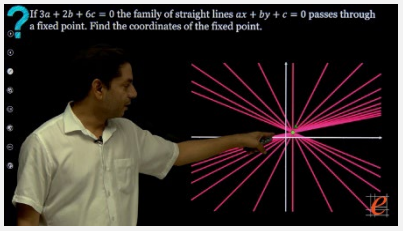


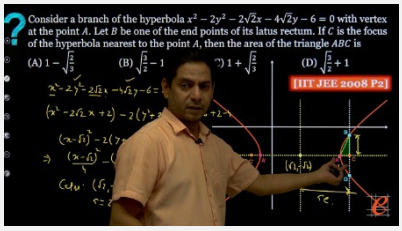


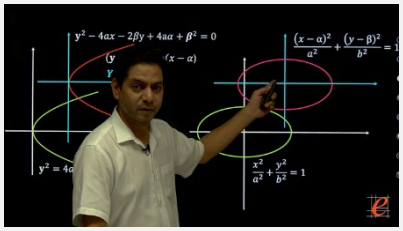


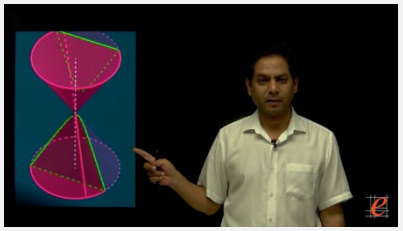


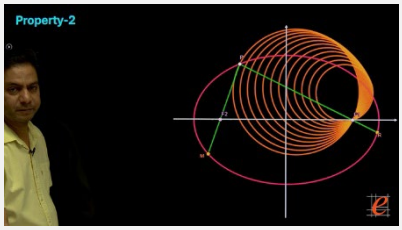


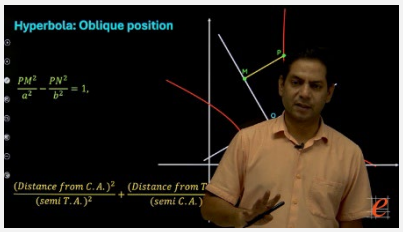


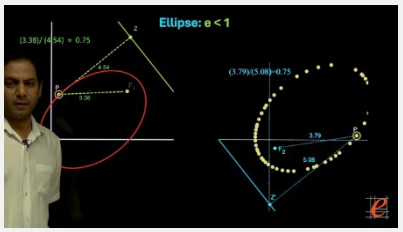


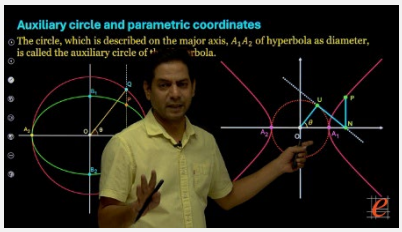


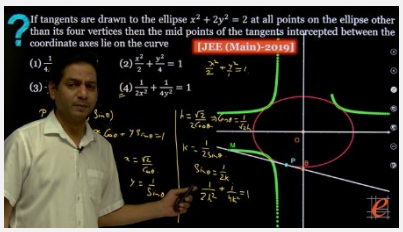


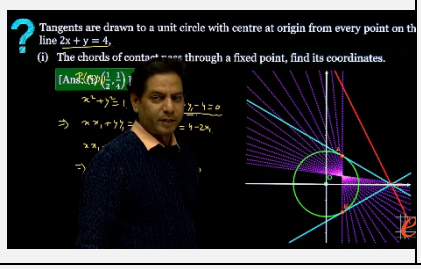


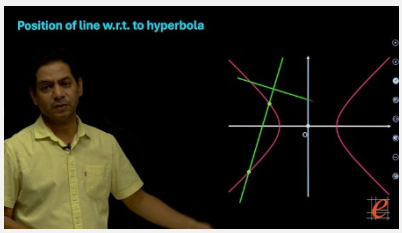


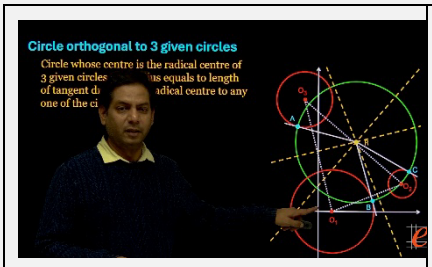


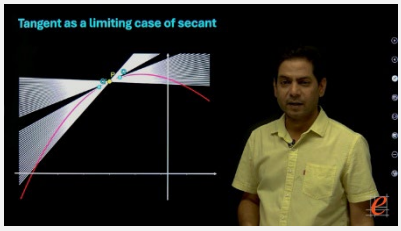


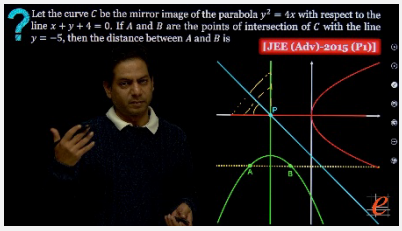


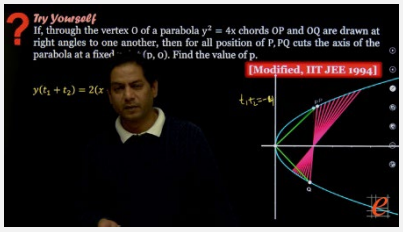


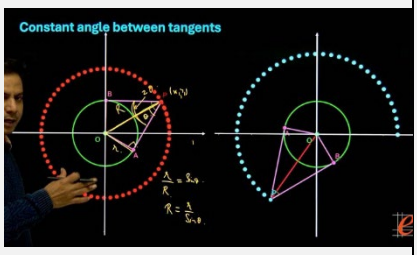


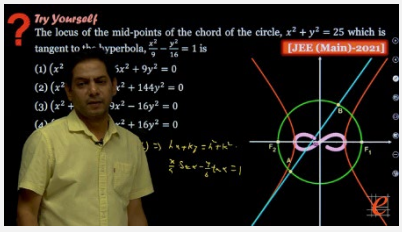

Circle orthogonal to 3 given circles

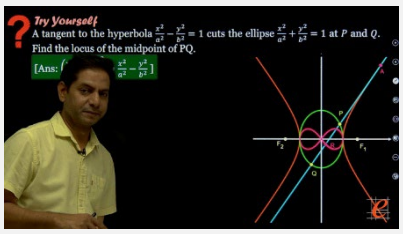

Tangent as a limiting case of secant

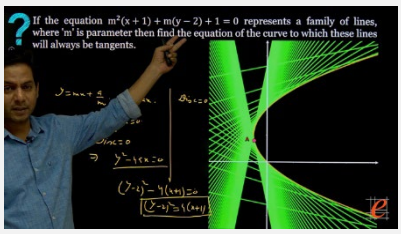

Let the curve C be the mirror image of the parabola $y^2 = 4x$ with respect to the line $x + y + 4 = 0$. If A and B are the points of intersection of C with the line $y = -5$, then the distance between A and B is
[JEE (Adv)-2015 (P1)]

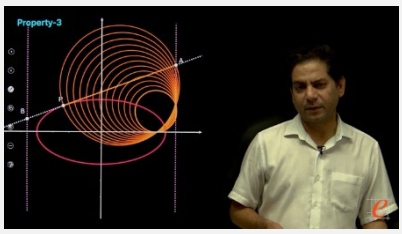

Try Yourself
If, through the vertex O of a parabola $y^2 = 4x$ chords OP and OQ are drawn at right angles to one another, then for all position of P, PQ cuts the axis of the parabola at a fixed
[Modified, IIT JEE 1994]

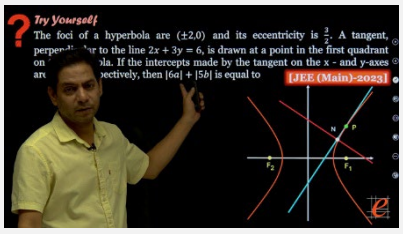

Constant angle between tangents

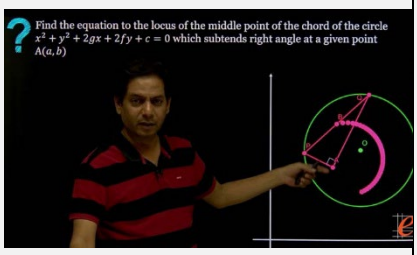

Try Yourself
The locus of the mid-points of the chord of the circle, $x^2 + y^2 = 25$ which is tangent to
[JEE (Main)-2021]

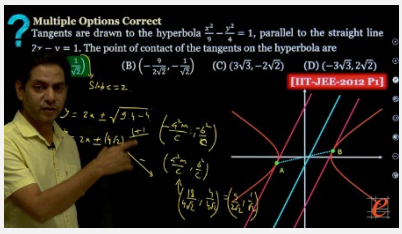

Try Yourself
A tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ cuts the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at P and Q. Find the locus of the midpoint of PQ.

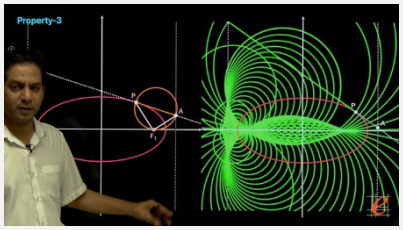

If the equation $m^2(x+1) + m(y-2) + 1 = 0$ represents a family of lines, where 'm' is parameter then find the equation of the curve to which these lines will always be tangents.

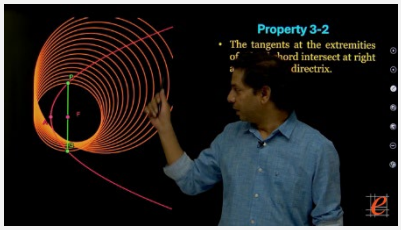

Property-3

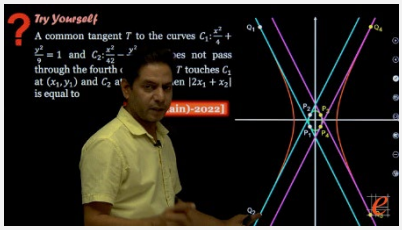

Try Yourself
The foci of a hyperbola are (±2,0) and its eccentricity is $\frac{3}{2}$. A tangent,
to the line $2x + 3y = 6$, is drawn at a point in the first quadrant
If the intercepts made by the tangent on the x - and y-axes
respectively, then $|6a| + |5b|$ is equal to
[JEE (Main)-2023]

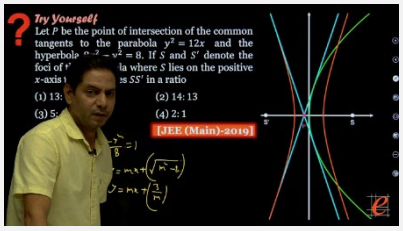

Find the equation to the locus of the middle point of the chord of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ which subtends right angle at a given point $A(a, b)$

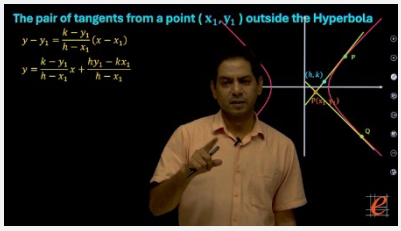

Multiple Options Correct
Tangents are drawn to the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$, parallel to the straight line $2x - y = 1$. The point of contact of the tangents on the hyperbola are
(B) $\left(-\frac{9}{2\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ (C) $(3\sqrt{3}, -2\sqrt{2})$ (D) $(-3\sqrt{3}, 2\sqrt{2})$
[IIT-JEE-2012 P1]

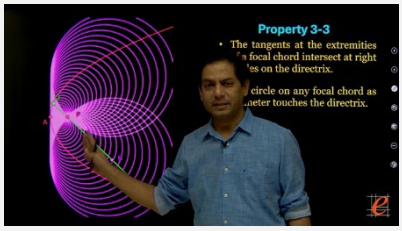

Property-3

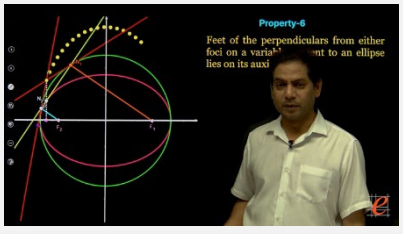

Property 3-2
The tangents at the extremities of
directrix.

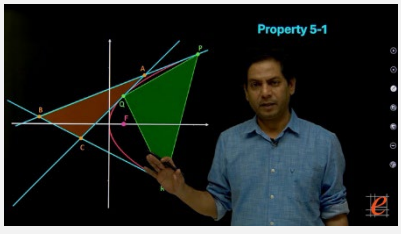

Try Yourself
A common tangent T to the curves $C_1: \frac{x^2}{4} +$
$\frac{y^2}{9} = 1$ and $C_2: \frac{x^2}{42} -$
through the fourth
at (x_1, y_1) and C_2 a
is equal to

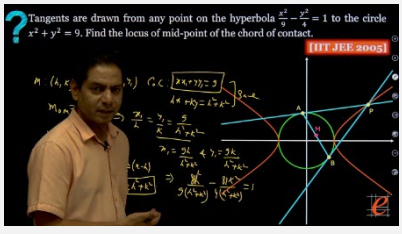

Try Yourself
Let P be the point of intersection of the common tangents to the parabola $y^2 = 12x$ and the hyperbola
where S lies on the positive
x-axis
(1) 13:
(2) 14: 13
(3) 5:
(4) 2: 1
[JEE (Main)-2019]

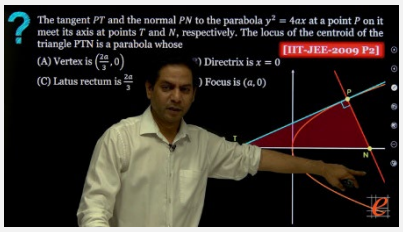

The pair of tangents from a point (x_1, y_1) outside the Hyperbola

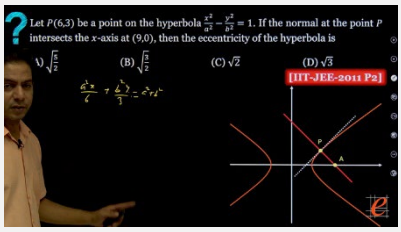

Property 3-3
The tangents at the extremities
focal chord intersect at right
les on the directrix.
circle on any focal chord as
meter touches the directrix.

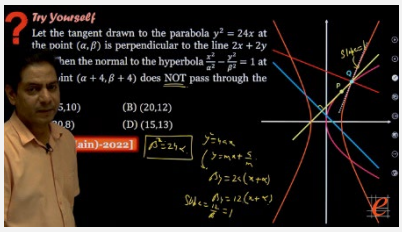

Property-6
Feet of the perpendiculars from either foci on a variable
nt to an ellipse lies on its auxi

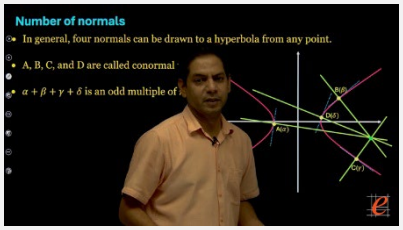

Property 5-1

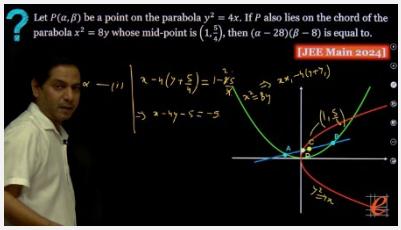

Tangents are drawn from any point on the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ to the circle $x^2 + y^2 = 9$. Find the locus of mid-point of the chord of contact.
[IIT JEE 2005]

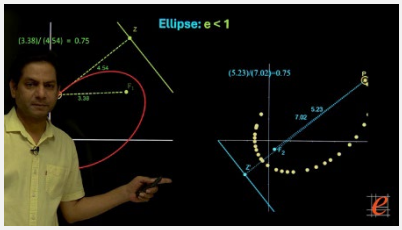


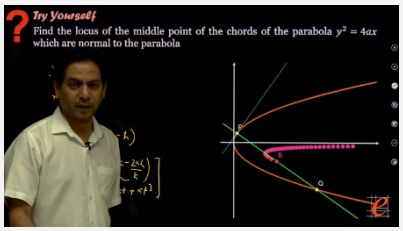


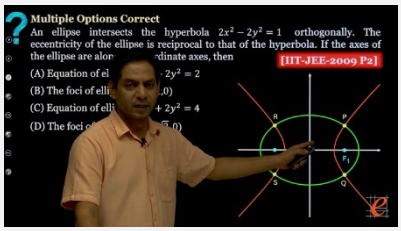


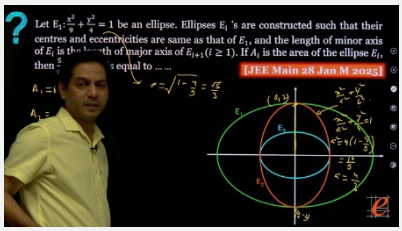


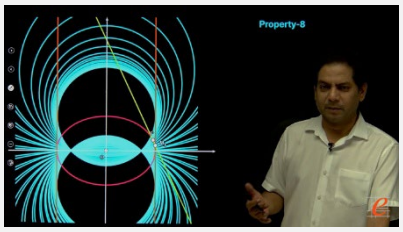


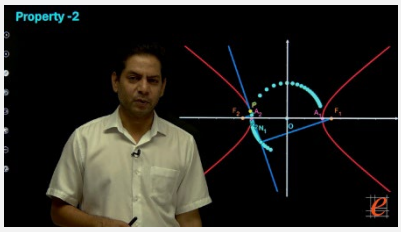


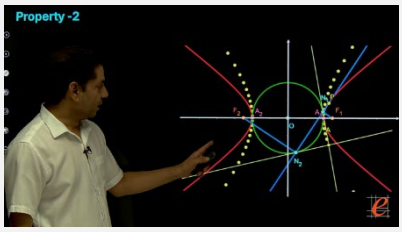


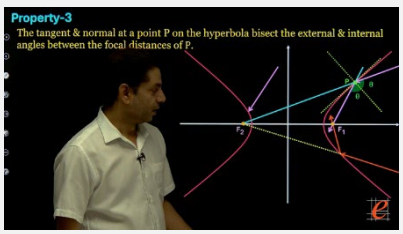


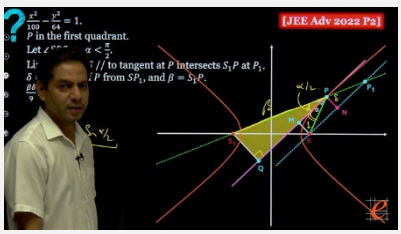


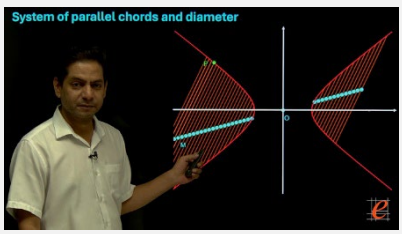


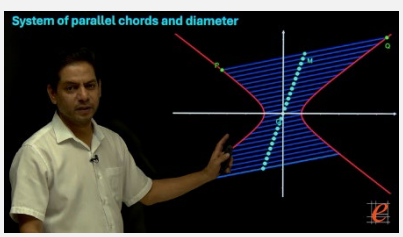


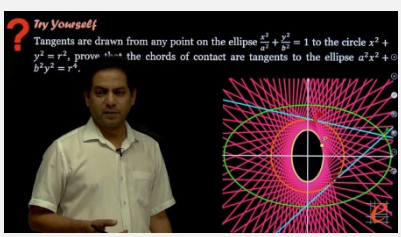


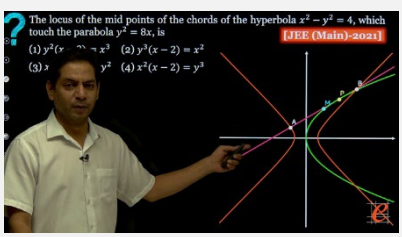












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