EdLoop

EdLoop JEE

MATHEMATICS · JEE MAIN

Parabola

Previous Year Questions with answers

134 questions · **129** papers · **2002–2026** · newest paper first

Step-by-step solutions for every question: free in the EdLoop JEE app (Google Play) · pyq.edloop.in

What is in this PDF: every Parabola question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

Step-by-step solutions for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

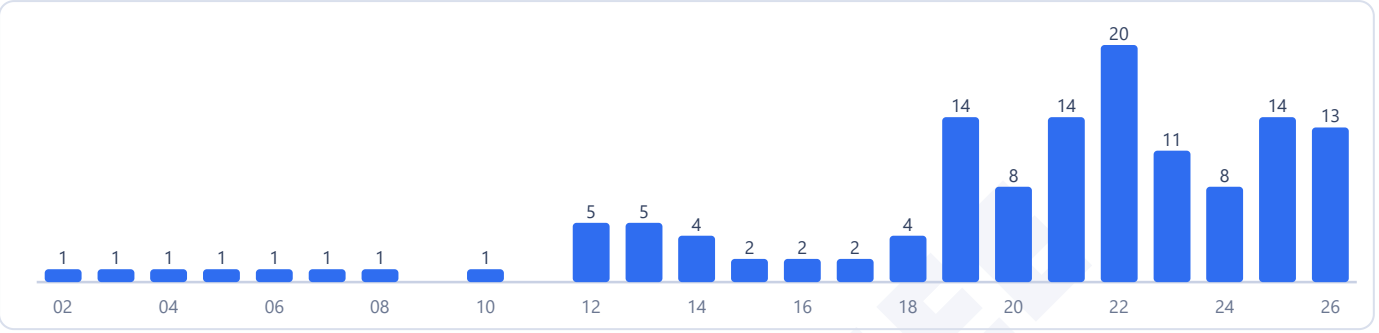
EdLoop

Chapter at a glance

2.2%	134	97 of 162	111 / 23
of Mathematics questions, 2019–2026	questions, 2002–2026	papers asked it, 2019–2026	MCQ / numerical, 2002–2026

Trend. Steady: 0.6 questions per paper in 2024–2026 against 0.6 in 2019–2023.

Questions per year



Counts are the questions we hold: 134 in 129 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2002–2026)

Tangents, Normals & Chords	96
Standard Forms	38

How often it comes up

Parabola serves as the introductory curve for conic section geometry under Unit 10: Coordinate Geometry in the Class 11 curriculum, placing it at rank 20 among the 29 chapters in the subject. Between 2019 and 2026, the examination presented 102 questions from this chapter across 162 papers, representing 2.2 percent of all mathematics questions. It appeared in 97 of those 162 papers and has been featured every year since 2019. Over the recent 2024 to 2026 test cycle, it contributed 35 questions across 58 papers, averaging 0.6 questions per paper with a 2.3 percent subject share. Comparing the 2002 to 2018 window share of 2.4 percent to the 2024 to 2026 share shows that the long-term trend is about the same, and comparing 2019 to 2026 with 2024 to 2026 also shows it is about the same. Across the complete archive from 2002 to 2026 spanning 200 papers, 134 questions were asked in 129 papers, with 23 numerical answer questions appearing between 2019 and 2026.

In the 2024, 2025, and 2026 testing sessions, the question counts were 8, 14, and 13 questions respectively.

Parabolas also feature prominently in boundary problems under area under curves and tangent intersections with circles or ellipses. Questions commonly ask for locus derivations of moving triangle centres, properties of chords subtending right angles at the vertex, or geometric segments along focal chords.

Most-asked topics

Questions in this chapter concentrate in two main thematic categories:

1. **Tangents, Normals & Chords (73 questions, 2019-2026; 96 total, last asked 2026)** The largest subtopic in the chapter. Covers equations of chords with given midpoints, focal chord properties where the product of parametric coordinates equals minus one, chords subtending right angles at the vertex, tangents in slope and point forms, and normal lines.

2. **Standard Forms (29 questions, 2019-2026; 38 total, last asked 2026)** Focuses on the four standard orientations, shifting vertices away from the origin, directrix and focus coordinates, latus rectum length, focal distances, parametric coordinates at squared and two at, and locus problems involving centroid and midpoint paths.

What the questions look like

Examiners repeatedly employ distinct geometric patterns when designing parabola problems:

- **Focal Chord Parametric Relations**: A chord passes through the focus (a, 0), establishing that the parameters of its endpoints satisfy t1 multiplied by t2 equals minus one. Questions evaluate harmonic mean properties of focal lengths or coordinate ratios.
- **Right Angle Subtended at the Vertex**: A chord connecting two points on the curve subtends a right angle at the vertex, establishing that the product of the parameter values equals minus four.
- **Locus of Triangle Centroids and Midpoints**: Inscribed triangles with one vertex at the origin and remaining vertices moving along the curve under perpendicularity or area constraints, asking for the algebraic curve traced by the centroid.
- **Chord Bisected at a Given Point**: Finding the equation of a secant chord whose midpoint is specified, solved using the classical T equals S1 relation.

How to practise it

Solving parabola problems with confidence relies on parametric coordinates:

- **Adopt parametric coordinates immediately**: Instead of working with Cartesian coordinates (x, y), label points on y squared equals 4ax as (a t squared, 2at). This replaces two-variable systems with single-parameter algebraic expressions.
- **Memorise focal chord parameter properties**: Remember that if a chord passes through the focus, the endpoint parameters satisfy t1 t2 equals minus one. Consequently, the length of the focal chord equals a multiplied by the square of t minus one over t plus four.
- **Use the chord with given midpoint identity**: To write the line containing a chord whose midpoint is (x1, y1), apply T equals S1 directly. For y squared equals 4ax, this simplifies to y y1 minus 2a(x plus x1) equals y1 squared minus 4a x1.
- **Exploit vertex subtended angle identities**: If a chord joining t1 and t2 subtends a right angle at the origin, the slope product condition reduces to t1 t2 equals minus four. This immediately fixes the x-intercept of the chord line at 4a on the axis of symmetry.

EdLoop JEE

Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

Let O be the vertex of the parabola $y^2 = 4x$ and its chords OP and OQ are perpendicular to each other. If the locus of the mid-point of the line segment PQ is a conic C, then the length of its latus rectum is :

(A) 1
(B) 2
(C) 4
(D) 8

Answer: (B) 2 · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

Let chord PQ of length $3\sqrt{13}$ of the parabola $y^2 = 12x$ be such that the ordinates of points P and Q are in the ratio 1:2. If the chord PQ subtends an angle α at the focus of the parabola, then $\sin\alpha$ is equal to:

(A) $\frac{3}{5}$
(B) $\frac{4}{5}$
(C) $\frac{5}{13}$
(D) $\frac{12}{13}$

Answer: (A) $\frac{3}{5}$ · Official NTA final key

Q3 JEE Main 2026 · 5 Apr · Shift 2 MCQ

Let the directrix of the parabola $\mathrm{P} : y^2 = 8x$, cut x-axis at the point A. Let B (α, β), $\alpha > 1$, be a point on P such that the slope of AB is 3/5. If BC is a focal chord of P, then six times the area of ΔABC is :

(A) 80
(B) 160
(C) 174
(D) 192

Answer: (B) 160 · Official NTA final key

Q4 JEE Main 2026 · 4 Apr · Shift 2 Numerical

Let A, B and C be the vertices of a variable right angled triangle inscribed in the parabola $y^2 = 16x$. Let the vertex B containing the right angle be $(4, 8)$ and the locus of the centroid of ΔABC be a conic $\mathrm{C_o}$. Then three times the length of latus rectum of $\mathrm{C_o}$ is _____.

Numerical value type: the answer is a number.

Answer: 16. · Official NTA final key

Q5 JEE Main 2026 · 2 Apr · Shift 2 MCQ

Let the parabola $y = x^2 + \mathrm{p}x + \mathrm{q}$ passing through the point $(1, -1)$ be such that the distance between its vertex and the x-axis is minimum. Then the value of $\mathrm{p}^2 + \mathrm{q}^2$ is :

(A) 2
(B) 4
(C) 5
(D) 8

Answer: (B) 4 · Official NTA final key

Q6 JEE Main 2026 · 28 Jan · Shift 2 MCQ

Let A be the focus of the parabola $y^2 = 8x$. Let the line $y = mx + c$ intersect the parabola at two distinct points B and C. If the centroid of the triangle ABC is $\left(\frac{7}{3}, \frac{4}{3}\right)$, then $(\mathrm{BC})^2$ is equal to :

(A) 41
(B) 89
(C) 32
(D) 80

Answer: (D) 80 · Official NTA final key

Q7 JEE Main 2026 · 24 Jan · Shift 2 MCQ

Let the image of parabola $x^2 = 4y$, in the line $x - y = 1$ be $(y + a)^2 = b(x - c)$, $a, b, c \in \mathbb{N}$. Then $a + b + c$ is equal to

(A) 4
(B) 6
(C) 12
(D) 8

Answer: (B) 6 · Official NTA final key

Q8 JEE Main 2026 · 23 Jan · Shift 2 MCQ

An equilateral triangle OAB is inscribed in the parabola $y^2 = 4x$ with the vertex O at the vertex of the parabola. Then the minimum distance of the circle having AB as a diameter from the origin is

(A) $4\left(6+\sqrt{3}\right)$
(B) $4\left(3-\sqrt{3}\right)$
(C) $2\left(8-3\sqrt{3}\right)$
(D) $2\left(3+\sqrt{3}\right)$

Answer: (B) $4\left(3-\sqrt{3}\right)$ · Official NTA final key

Q9 JEE Main 2026 · 22 Jan · Shift 1 MCQ

If the chord joining the points $\mathrm{P}_1(x_1, y_1)$ and $\mathrm{P}_2(x_2, y_2)$ on the parabola $y^2 = 12x$ subtends a right angle at the vertex of the parabola, then $x_1x_2 - y_1y_2$ is equal to

(A) 292
(B) 288
(C) 284
(D) 280

Answer: (B) 288 · Official NTA final key

Q10 JEE Main 2026 · 22 Jan · Shift 2 MCQ

Let the locus of the mid-point of the chord through the origin O of the parabola $y^2 = 4x$ be the curve S. Let P be any point on S. Then the locus of the point, which internally divides OP in the ratio $3 : 1$, is :

(A) $3y^2 = 2x$
(B) $3x^2 = 2y$
(C) $2y^2 = 3x$
(D) $2x^2 = 3y$

Answer: (C) $2y^2 = 3x$ · Official NTA final key

Q11 JEE Main 2026 · 21 Jan · Shift 1 MCQ

Let O be the vertex of the parabola $x^2 = 4y$ and Q be any point on it. Let the locus of the point P, which divides the line segment OQ internally in the ratio 2 : 3 be the conic C. Then the equation of the chord of C, which is bisected at the point $(1, 2)$, is :

(A) $5x - 4y + 3 = 0$
(B) $x - 2y + 3 = 0$
(C) $5x - y - 3 = 0$
(D) $4x - 5y + 6 = 0$

Answer: (A) $5x - 4y + 3 = 0$ · Official NTA final key

Q12 JEE Main 2026 · 21 Jan · Shift 2 MCQ

Let one end of a focal chord of the parabola $y^2 = 16x$ be $(16, 16)$. If $\mathrm{P}(\alpha, \beta)$ divides this focal chord internally in the ratio 5 : 2, then the minimum value of $\alpha + \beta$ is equal to :

(A) 5
(B) 7
(C) 16
(D) 22

Answer: (B) 7 · Official NTA final key

Q13 JEE Main 2026 · 21 Jan · Shift 2 MCQ

Let $y^2 = 12x$ be the parabola with its vertex at O. Let P be a point on the parabola and A be a point on the x-axis such that $\angle \mathrm{OPA} = 90^\circ$. Then the locus of the centroid of such triangles OPA is :

(A) $y^2 - 4x + 8 = 0$
(B) $y^2 - 6x + 4 = 0$
(C) $y^2 - 9x + 6 = 0$
(D) $y^2 - 2x + 8 = 0$

Answer: (D) $y^2 - 2x + 8 = 0$ · Official NTA final key

Q14 JEE Main 2025 · 8 Apr · Shift 2 Numerical

Let r be the radius of the circle, which touches x - axis at point $(a, 0), a < 0$ and the parabola $y^2 = 9x$ at the point $(4, 6)$. Then r is equal to _____.

Numerical value type: the answer is a number.

Answer: 30. · Key from source paper

Q15 JEE Main 2025 · 7 Apr · Shift 1 MCQ

Let P be the parabola, whose focus is (–2, 1) and directrix is $2x + y + 2 = 0$. Then the sum of the ordinates of the points on P, whose abscissa is -2, is

(A) $\frac{3}{4}$
(B) $\frac{3}{2}$
(C) $\frac{1}{4}$
(D) $\frac{5}{2}$

Answer: (B) $\frac{3}{2}$ · Key from source paper

Q16 JEE Main 2025 · 4 Apr · Shift 2 MCQ

The axis of a parabola is the line $y = x$ and its vertex and focus are in the first quadrant at distances $\sqrt{2}$ and $2\sqrt{2}$ units from the origin, respectively. If the point $(1, k)$ lies on the parabola, then a possible value of k is :

(A) 8
(B) 3
(C) 4
(D) 9

Answer: (D) 9 · Key from source paper

Q17 JEE Main 2025 · 3 Apr · Shift 1 MCQ

The radius of the smallest circle which touches the parabolas $y = x^2 + 2$ and $x = y^2 + 2$ is

(A) $\frac{7\sqrt{2}}{2}$
(B) $\frac{7\sqrt{2}}{8}$
(C) $\frac{7\sqrt{2}}{16}$
(D) $\frac{7\sqrt{2}}{4}$

Answer: (B) $\frac{7\sqrt{2}}{8}$ · Key from source paper

Q18 JEE Main 2025 · 3 Apr · Shift 2 MCQ

The shortest distance between the curves $y^2 = 8x$ and $x^2 + y^2 + 12y + 35 = 0$ is:

(A) $\sqrt{2}$
(B) $3\sqrt{2} - 1$
(C) $2\sqrt{2} - 1$
(D) $2\sqrt{3} - 1$

Answer: (C) $2\sqrt{2} - 1$ · Key from source paper

Q19 JEE Main 2025 · 2 Apr · Shift 1 MCQ

Let the focal chord PQ of the parabola $y^2 = 4x$ make an angle of 60° with the positive x axis, where P lies in the first quadrant. If the circle, whose one diameter is PS , S being the focus of the parabola, touches the y -axis at the point $(0, \alpha)$, then $5\alpha^2$ is equal to :

(A) 20
(B) 30
(C) 25
(D) 15

Answer: (D) 15 · Key from source paper

Q20 JEE Main 2025 · 2 Apr · Shift 2 MCQ

Let the point P of the focal chord PQ of the parabola $y^2 = 16x$ be $(1, -4)$. If the focus of the parabola divides the chord PQ in the ratio $m : n, \gcd(m, n) = 1$, then $m^2 + n^2$ is equal to :

(A) 37
(B) 26
(C) 10
(D) 17

Answer: (D) 17 · Key from source paper

Q21 JEE Main 2025 · 29 Jan · Shift 1 MCQ

Two parabolas have the same focus $(4,3)$ and their directrices are the x-axis and the y-axis, respectively. If these parabolas intersects at the points A and B, then $(AB)^2$ is equal to :

(A) 392
(B) 384
(C) 192
(D) 96

Answer: (C) 192 · Key from source paper

Q22 JEE Main 2025 · 29 Jan · Shift 2 Numerical

Let $y^2 = 12x$ be the parabola and S be its focus. Let PQ be a focal chord of the parabola such that $(\mathrm{SP})(\mathrm{SQ}) = \frac{147}{4}$. Let C be the circle described taking PQ as a diameter. If the equation of a circle C is $64x^2 + 64y^2 - \alpha x - 64\sqrt{3}y = \beta$, then $\beta - \alpha$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 1328. · Key from source paper

Q23 JEE Main 2025 · 28 Jan · Shift 1 MCQ

Let $ABCD$ be a trapezium whose vertices lie on the parabola $y^2 = 4x$. Let the sides AD and BC of the trapezium be parallel to y -axis. If the diagonal AC is of length $\frac{25}{4}$ and it passes through the point $(1,0)$, then the area of $ABCD$ is

(A) $\frac{75}{4}$
(B) $= \frac{25}{2}$
(C) $\frac{125}{8}$
(D) $\frac{75}{8}$

Answer: (A) $\frac{75}{4}$ · Key from source paper

Q24 JEE Main 2025 · 28 Jan · Shift 2 Numerical

Let A and B be the two points of intersection of the line $y + 5 = 0$ and the mirror image of the parabola $y^2 = 4x$ with respect to the line $x + y + 4 = 0$. If d denotes the distance between A and B , and a denotes the area of $\triangle SAB$, where S is the focus of the parabola $y^2 = 4x$, then the value of $(a + d)$ is _____ .

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q25 JEE Main 2025 · 24 Jan · Shift 2 MCQ

If the equation of the parabola with vertex $\mathrm{V}\left(\frac{3}{2}, 3\right)$ and the directrix $x+2y=0$ is $\alpha x^2+\beta y^2-\gamma xy-30x-60y+225=0$, then $\alpha+\beta+\gamma$ is equal to :

(A) 7
(B) 9
(C) 8
(D) 6

Answer: (B) 9 · Key from source paper

Q26 JEE Main 2025 · 23 Jan · Shift 2 MCQ

Let the shortest distance from $(\mathrm{a}, 0)$, $\mathrm{a}>0$, to the parabola $y^2=4x$ be 4 . Then the equation of the circle passing through the point $(\mathrm{a}, 0)$ and the focus of the parabola, and having its centre on the axis of the parabola is :

(A) $x^2+y^2-10x+9=0$
(B) $x^2+y^2-6x+5=0$
(C) $x^2+y^2-4x+3=0$
(D) $x^2+y^2-8x+7=0$

Answer: (B) $x^2+y^2-6x+5=0$ · Key from source paper

Q27 JEE Main 2025 · 22 Jan · Shift 2 MCQ

Let $\mathrm{P}(4, 4\sqrt{3})$ be a point on the parabola $y^2=4\mathrm{a}x$ and PQ be a focal chord of the parabola. If M and N are the foot of perpendiculars drawn from P and Q respectively on the directrix of the parabola, then the area of the quadrilateral PQMN is equal to :

(A) $17\sqrt{3}$
(B) $\frac{263\sqrt{3}}{8}$
(C) $\frac{34\sqrt{3}}{3}$
(D) $\frac{343\sqrt{3}}{8}$

Answer: (D) $\frac{343\sqrt{3}}{8}$ · Key from source paper

Q28 JEE Main 2024 · 9 Apr · Shift 2 Numerical

Let A, B and C be three points on the parabola $y^2=6x$ and let the line segment AB meet the line L through C parallel to the x-axis at the point D. Let M and N respectively be the feet of the perpendiculars from A and B on L. Then $\left(\frac{AM \cdot BN}{CD}\right)^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 36. · Key from source paper

Q29 JEE Main 2024 · 5 Apr · Shift 1 Numerical

Suppose AB is a focal chord of the parabola $y^2 = 12x$ of length l and slope m $< \sqrt{3}$. If the distance of the chord AB from the origin is d, then $l\,\mathrm{d}^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 108. · Key from source paper

Q30 JEE Main 2024 · 5 Apr · Shift 2 Numerical

Let a line perpendicular to the line $2x - y = 10$ touch the parabola $y^2 = 4(x - 9)$ at the point P. The distance of the point P from the centre of the circle $x^2 + y^2 - 14x - 8y + 56 = 0$ is _____

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q31 JEE Main 2024 · 4 Apr · Shift 1 Numerical

Let the length of the focal chord PQ of the parabola $y^2 = 12x$ be 15 units. If the distance of PQ from the origin is p, then $10\mathrm{p}^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 72. · Key from source paper

Q32 JEE Main 2024 · 4 Apr · Shift 2 MCQ

Let PQ be a chord of the parabola $y^2 = 12x$ and the midpoint of PQ be at $(4, 1)$. Then, which of the following point lies on the line passing through the points P and Q?

(A) $(3, -3)$
(B) $(2, -9)$
(C) $\left(\frac{3}{2}, -16\right)$
(D) $\left(\frac{1}{2}, -20\right)$

Answer: (D) $\left(\frac{1}{2}, -20\right)$ · Key from source paper

Q33 JEE Main 2024 · 31 Jan · Shift 2 MCQ

Let P be a parabola with vertex $(2, 3)$ and directrix $2x + y = 6$. Let an ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$ of eccentricity $\frac{1}{\sqrt{2}}$ pass through the focus of the parabola P. Then the square of the length of the latus rectum of E, is

(A) $\frac{385}{8}$
(B) $\frac{347}{8}$
(C) $\frac{512}{25}$
(D) $\frac{656}{25}$

Answer: (D) $\frac{656}{25}$ · Key from source paper

Q34 JEE Main 2024 · 29 Jan · Shift 2 Numerical

Let $P(\alpha, \beta)$ be a point on the parabola $y^2 = 4x$. If P also lies on the chord of the parabola $x^2 = 8y$ whose mid point is $\left(1, \frac{5}{4}\right)$, then $(\alpha - 28)(\beta - 8)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 192. · Key from source paper

Q35 JEE Main 2024 · 27 Jan · Shift 1 MCQ

If the shortest distance of the parabola $y^2 = 4x$ from the centre of the circle $x^2 + y^2 - 4x - 16y + 64 = 0$ is d, then d^2 is equal to :

(A) 16
(B) 24
(C) 20
(D) 36

Answer: (C) 20 · Key from source paper

Q36 JEE Main 2023 · 13 Apr · Shift 1 MCQ

Let PQ be a focal chord of the parabola $y^2 = 36x$ of length 100, making an acute angle with the positive x-axis. Let the ordinate of P be positive and M be the point on the line segment PQ such that $PM : MQ = 3 : 1$. Then which of the following points does NOT lie on the line passing through M and perpendicular to the line PQ?

(A) $(-6, 45)$
(B) $(6, 29)$
(C) $(3, 33)$
(D) $(-3, 43)$

Answer: (D) $(-3, 43)$ · Key from source paper

Q37 JEE Main 2023 · 10 Apr · Shift 1 Numerical

Let a common tangent to the curves $y^2 = 4x$ and $x - 4^2 + y^2 = 16$ touch the curves at the points P and Q. Then PQ^2 is equal to _____.

Numerical value type: the answer is a number.

Answer: 32. · Key from source paper

Q38 JEE Main 2023 · 8 Apr · Shift 1 MCQ

Let R be the focus of the parabola $y^2 = 20x$ and the line $y = mx + c$ intersect the parabola at two points P and Q. Let the points $G(10, 10)$ be the centroid of the triangle PQR. If $c - m = 6$, then PQ^2 is

(A) 296
(B) 325
(C) 317
(D) 346

Answer: (B) 325 · Key from source paper

Q39 JEE Main 2023 · 8 Apr · Shift 2 Numerical

The ordinates of the points P and Q on the parabola with focus $(3, 0)$ and directrix $x = -3$ are in the ratio $3 : 1$. If $R(\alpha, \beta)$ is the point of intersection of the tangents to the parabola at P and Q, then $\frac{\beta^2}{\alpha}$ is equal to

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q40 JEE Main 2023 · 1 Feb · Shift 2 Numerical

If the x-intercept of a focal chord of the parabola $y^2 = 8x + 4y + 4$ is 3, then the length of this chord is equal to _____.

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q41 JEE Main 2023 · 31 Jan · Shift 2 Numerical

Let S be the set of all $a \in N$ such that the area of the triangle formed by the tangent at the point $P(b, c), b, c \in N$, on the parabola $y^2 = 2ax$ and the lines $x = b$, $y = 0$ is 16 unit^2, then $\sum_{a \in S} a$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 146. · Key from source paper

Q42 JEE Main 2023 · 30 Jan · Shift 1 MCQ

If $P(h, k)$ be point on the parabola $x = 4y^2$, which is nearest to the point $Q(0, 33)$, then the distance of P from the directrix of the parabola $y^2 = 4(x + y)$ is equal to:

(A) 2
(B) 4
(C) 8
(D) 6

Answer: (D) 6 · Key from source paper

Q43 JEE Main 2023 · 30 Jan · Shift 2 MCQ

Let A be a point on the x-axis. Common tangents are drawn from A to the curves $x^2 + y^2 = 8$ and $y^2 = 16x$. If one of these tangents touches the two curves at Q and R, then $(QR)^2$ is equal to

(A) 64
(B) 76
(C) 81
(D) 72

Answer: (D) 72 · Key from source paper

Q44 JEE Main 2023 · 25 Jan · Shift 1 MCQ

The distance of the point $\left(6, -2\sqrt{2}\right)$ from the common tangent $y = mx + c, m > 0$, of the curves $x = 2y^2$ and $x = 1 + y^2$ is

(A) $\frac{1}{3}$
(B) 5
(C) $\frac{14}{3}$
(D) $5\sqrt{3}$

Answer: (B) 5 · Key from source paper

Q45 JEE Main 2023 · 25 Jan · Shift 2 MCQ

The equations of two sides of a variable triangle are $\mathrm{x} = 0$ and $\mathrm{y} = 3$, and its third side is a tangent to the parabola $y^2 = 6x$. The locus of its circumcentre is :

(A) $4y^2 - 18y - 3x - 18 = 0$
(B) $4y^2 + 18y + 3x + 18 = 0$
(C) $4y^2 - 18y + 3x + 18 = 0$
(D) $4y^2 - 18y - 3x + 18 = 0$

Answer: (C) $4y^2 - 18y + 3x + 18 = 0$ · Key from source paper

---

Q46 JEE Main 2023 · 24 Jan · Shift 1 MCQ

Let a tangent to the curve $y^2 = 24x$ meet the curve $xy = 2$ at the points A and B. Then the mid-points of such line segments AB lie on a parabola with the

(A) directrix $4x = 3$
(B) directrix $4x = -3$
(C) Length of latus rectum $\frac{3}{2}$
(D) Length of latus rectum 2

Answer: (A) directrix $4x = 3$ · Key from source paper

Q47 JEE Main 2022 · 29 Jul · Shift 1 MCQ

Let the focal chord of the parabola $P : y^2 = 4x$ along the line $L : y = mx + c, m > 0$ meet the parabola at the points M and N. Let the line L be a tangent to the hyperbola $H : x^2 - y^2 = 4$. If O is the vertex of P and F is the focus of H on the positive x-axis, then the area of the quadrilateral $OMFN$ is

(A) $2\sqrt{6}$
(B) $2\sqrt{14}$
(C) $4\sqrt{6}$
(D) $4\sqrt{14}$

Answer: (B) $2\sqrt{14}$ · Key from source paper

Q48 JEE Main 2022 · 28 Jul · Shift 1 MCQ

If the tangents drawn at the points P and Q on the parabola $y^2 = 2x - 3$ intersect at the point $R(0, 1)$, then the orthocentre of the triangle PQR is

(A) $(0, 1)$
(B) $(2, -1)$
(C) $(6, 3)$
(D) $(2, 1)$

Answer: (B) $(2, -1)$ · Key from source paper

Q49 JEE Main 2022 · 28 Jul · Shift 2 Numerical

Two tangent lines l_1 and l_2 are drawn from the point $(2, 0)$ to the parabola $2y^2 = -x$. If the lines l_1 and l_2 are also tangent to the circle $(x - 5)^2 + y^2 = r^2$, then $17r^2$ is equal to

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q50 JEE Main 2022 · 27 Jul · Shift 1 MCQ

Let $P(a, b)$ be a point on the parabola $y^2 = 8x$ such that the tangent at P passes through the centre of the circle $x^2 + y^2 - 10x - 14y + 65 = 0$. Let A be the product of all possible values of a and B be the product of all possible values of b. Then the value of $A + B$ is equal to

(A) 0
(B) 25
(C) 40
(D) 65

Answer: (D) 65 · Key from source paper

Q51 JEE Main 2022 · 27 Jul · Shift 2 MCQ

If the length of the latus rectum of a parabola, whose focus is (a, a) and the tangent at its vertex is $x + y = a$, is 16, then $|a|$ is equal to

(A) $2\sqrt{2}$
(B) $2\sqrt{3}$
(C) $4\sqrt{2}$
(D) 4

Answer: (C) $4\sqrt{2}$ · Key from source paper

Q52 JEE Main 2022 · 26 Jul · Shift 1 Numerical

Let the function $f(x) = 2x^2 - \log_e x$, $x > 0$, be decreasing in $(0, a)$ and increasing in $(a, 4)$. A tangent to the parabola $y^2 = 4ax$ at a point P on it passes through the point $(8a, 8a - 1)$ but does not pass through the point $\left(-\frac{1}{a}, 0\right)$. If the equation of the normal at P is $\frac{x}{\alpha} + \frac{y}{\beta} = 1$, then $\alpha + \beta$ is equal to

Numerical value type: the answer is a number.

Answer: 45. · Key from source paper

Q53 JEE Main 2022 · 26 Jul · Shift 2 MCQ

The equation of a common tangent to the parabolas $y = x^2$ and $y = -x - 2^2$ is

(A) $y = 4x - 2$
(B) $y = 4x - 1$
(C) $y = 4x + 1$
(D) $y = 4x + 2$

Answer: (B) $y = 4x - 1$ · Key from source paper

Q54 JEE Main 2022 · 25 Jul · Shift 1 Numerical

The sum of diameters of the circles that touch (i) the parabola $75x^2 = 64(5y - 3)$ at the point $\left(\frac{8}{5}, \frac{6}{5}\right)$ and (ii) the y-axis, is equal to _____.

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q55 JEE Main 2022 · 25 Jul · Shift 2 MCQ

The tangents at the points $A(1,3)$ and $B(1,-1)$ on the parabola $y^2-2x-2y=1$ meet at the point P. Then the area (in unit^2) of the triangle PAB is:

(A) 4
(B) 6
(C) 7
(D) 8

Answer: (D) 8 · Key from source paper

Q56 JEE Main 2022 · 29 Jun · Shift 1 MCQ

Let PQ be a focal chord of the parabola $y^2=4x$ such that it subtends an angle of $\frac{\pi}{2}$ at the point $(3,0)$. Let the line segment PQ be also a focal chord of the ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,\ a^2>b^2$. If e is the eccentricity of the ellipse E, then the value of $\frac{1}{e^2}$ is equal to

(A) $1+\sqrt{2}$
(B) $3+2\sqrt{2}$
(C) $1+2\sqrt{3}$
(D) $4+5\sqrt{3}$

Answer: (B) $3+2\sqrt{2}$ · Key from source paper

Q57 JEE Main 2022 · 29 Jun · Shift 2 MCQ

Let $P: y^2=4ax,\ a>0$ be a parabola with focus S.Let the tangents to the parabola P make an angle of $\frac{\pi}{4}$ with the line $y=3x+5$ touch the parabola P at A and B. Then the value of a for which A, B and S are collinear is:

(A) 8 only
(B) 2 only
(C) $\frac{1}{4}$only
(D) any $a>0$

Answer: (D) any $a>0$ · Key from source paper

Q58 JEE Main 2022 · 28 Jun · Shift 2 MCQ

If vertex of parabola is $(2,-1)$ and equation of its directrix is $4x-3y=21$, then the length of latus rectum is

EdLoop JEE

(A) 2
(B) 8
(C) 12
(D) 16

Answer: (B) 8 · Key from source paper

Q59 JEE Main 2022 · 27 Jun · Shift 2 MCQ

If the equation of the parabola, whose vertex is at $(5, 4)$ and the directrix is $3x + y - 29 = 0$, is $x^2 + ay^2 + bxy + cx + dy + k = 0$, then $a + b + c + d + k$ is equal to

(A) 575
(B) -575
(C) 576
(D) -576

Answer: (D) -576 · Key from source paper

Q60 JEE Main 2022 · 26 Jun · Shift 1 MCQ

Let the normal at the point P on the parabola $y^2 = 6x$ pass through the point $(5, -8)$. If the tangent at P to the parabola intersects its directrix at the point Q, then the ordinate of the point Q is

(A) $\frac{-9}{4}$
(B) $\frac{9}{4}$
(C) $\frac{-5}{2}$
(D) -3

Answer: (A) $\frac{-9}{4}$ · Key from source paper

Q61 JEE Main 2022 · 26 Jun · Shift 1 Numerical

Let the common tangents to the curves $4(x^2 + y^2) = 9$ and $y^2 = 4x$ intersect at the point Q. Let an ellipse, centered at the origin O, has lengths of semi-minor and semi-major axes equal to OQ and 6, respectively. If e and l respectively denote the eccentricity and the length of the latus rectum of this ellipse, then $\frac{l}{e^2}$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q62 JEE Main 2022 · 25 Jun · Shift 1 MCQ

If $y = m_1x + c_1$ and $y = m_2x + c_2$, $m_1 \neq m_2$ are two common tangents of circle $x^2 + y^2 = 2$ and parabola $y^2 = x$, then the value of $8m_1m_2$ is equal to

(A) $3\sqrt{2}-4$
(B) $6\sqrt{2}-4$
(C) $-5+6\sqrt{2}$
(D) $3+4\sqrt{2}$

Answer: (A) $3\sqrt{2}-4$ · Key from source paper

Q63 JEE Main 2022 · 25 Jun · Shift 1 MCQ

Let $x=2t, y=\frac{t^2}{3}$ be a conic. Let S be the focus and B be the point on the axis of the conic such that $SA \perp BA$, where A is any point on the conic. If k is the ordinate of the centroid of the ΔSAB, then $\lim_{t\to 1} k$ is equal to

(A) $\frac{17}{18}$
(B) $\frac{19}{18}$
(C) $\frac{11}{18}$
(D) $\frac{13}{18}$

Answer: (D) $\frac{13}{18}$ · Key from source paper

Q64 JEE Main 2022 · 25 Jun · Shift 2 MCQ

If the line $y=4+kx$, $k>0$, is the tangent to the parabola $y=x-x^2$ at the point P and V is the vertex of the parabola, then the slope of the line through P and V is

(A) $\frac{3}{2}$
(B) $\frac{26}{9}$
(C) $\frac{5}{2}$
(D) $\frac{23}{6}$

Answer: (C) $\frac{5}{2}$ · Key from source paper

Q65 JEE Main 2022 · 24 Jun · Shift 1 Numerical

If two tangents drawn from a point (α,β) lying on the ellipse $25x^2+4y^2=1$ to the parabola $y^2=4x$ are such that the slope of one tangent is four times the other, then the value of $(10\alpha+5)^2+(16\beta^2+50)^2$ equals

_____

Numerical value type: the answer is a number.

Answer: 2929. · Key from source paper

Q66 JEE Main 2022 · 24 Jun · Shift 2 Numerical

Let P_1 be a parabola with vertex $(3,2)$ and focus $(4,4)$ and P_2 be its mirror image with respect to the line $x+2y=6$. Then the directrix of P_2 is $x+2y=$ _____ .

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q67 JEE Main 2021 · 1 Sep · Shift 2 MCQ

Consider the parabola with vertex $\frac{1}{2}, \frac{3}{4}$ and the directrix $y = \frac{1}{2}$. Let P be the point where the parabola meets the line $x = -\frac{1}{2}$. If the normal to the parabola at P intersects the parabola again at the point Q . then $(\mathrm{PQ})^2$ is equal to :

(A) $\frac{25}{2}$
(B) $\frac{75}{8}$
(C) $\frac{125}{16}$
(D) $\frac{15}{2}$

Answer: (C) $\frac{125}{16}$ · Key from source paper

Q68 JEE Main 2021 · 31 Aug · Shift 1 MCQ

The length of the latus rectum of a parabola, whose vertex and focus are on the positive x-axis at a distance R and $S(> \mathrm{R})$ respectively from the origin, is :

(A) $2(S - R)$
(B) $2(S + R)$
(C) $4(S - R)$
(D) $4(S + R)$

Answer: (C) $4(S - R)$ · Key from source paper

Q69 JEE Main 2021 · 31 Aug · Shift 2 Numerical

A tangent line L is drawn at the point $2, -4$ on the parabola $y^2 = 8x$. If the line L is also tangent to the circle $x^2 + y^2 = a$, then a is equal to _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q70 JEE Main 2021 · 27 Aug · Shift 1 MCQ

A tangent and a normal are drawn at the point $P(2, -4)$ on the parabola $y^2 = 8x$, which meet the directrix of the parabola at the points A and B respectively. If $Q(a, b)$ is a point such that $AQBP$ is a square, then $2a + b$ is equal to

EdLoop JEE

(A) -12
(B) -20
(C) -16
(D) -18

Answer: (C) -16 · Key from source paper

Q71 JEE Main 2021 · 27 Aug · Shift 2 MCQ

If two tangents drawn from a point P to the parabola $y^2 = 16(x - 3)$ are at right angles, then the locus of point P is:

(A) $x + 4 = 0$
(B) $x + 2 = 0$
(C) $x + 3 = 0$
(D) $x + 1 = 0$

Answer: (D) $x + 1 = 0$ · Key from source paper

Q72 JEE Main 2021 · 26 Aug · Shift 1 MCQ

If a line along a chord of the circle $4x^2 + 4y^2 + 120x + 675 = 0$, passes through the point $(-30, 0)$ and is tangent to the parabola $y^2 = 30x$, then the length of this chord is:

(A) 5
(B) 7
(C) $3\sqrt{5}$
(D) $5\sqrt{3}$

Answer: (C) $3\sqrt{5}$ · Key from source paper

Q73 JEE Main 2021 · 25 Jul · Shift 1 MCQ

Let a parabola P be such that its vertex and focus lie on the positive x-axis at a distance 2 and 4 units from the origin, respectively. If tangents are drawn from $O(0, 0)$ to the parabola P which meet P at S and R, then area (in sq. units) of ΔSOR is equal to :

(A) $16\sqrt{2}$
(B) 16
(C) 32
(D) $8\sqrt{2}$

Answer: (B) 16 · Key from source paper

Q74 JEE Main 2021 · 20 Jul · Shift 1 MCQ

Let the tangent to the parabola $S : y^2 = 2x$ at the point $P(2, 2)$ meet the x-axis at Q and normal at it meet the parabola S at the point R. Then the area (in sq. units) of the triangle PQR is equal to:

(A) $\frac{25}{2}$
(B) $\frac{35}{2}$
(C) $\frac{15}{2}$
(D) 25

Answer: (A) $\frac{25}{2}$ · Key from source paper

Q75 JEE Main 2021 · 20 Jul · Shift 1 Numerical

Let $y = mx + c$, $m > 0$ be the focal chord of $y^2 = -64x$, which is tangent to $(x + 10)^2 + y^2 = 4$. Then, the value of $4\sqrt{2}\,(m + c)$ is equal to _____

Numerical value type: the answer is a number.

Answer: 34. · Key from source paper

Q76 JEE Main 2021 · 16 Mar · Shift 1 MCQ

If the three normals drawn to the parabola, $y^2 = 2x$ pass through the point $(a, 0), a \neq 0$, then a must be greater than :

(A) $\frac{1}{2}$
(B) $-\frac{1}{2}$
(C) -1
(D) 1

Answer: (D) 1 · Key from source paper

Q77 JEE Main 2021 · 16 Mar · Shift 2 MCQ

Let C be the locus of the mirror image of a point on the parabola $y^2 = 4x$ with respect to the line $y = x$. Then the equation of tangent to C at $P(2, 1)$ is :

(A) $x - y = 1$
(B) $2x + y = 5$
(C) $x + 3y = 5$
(D) $x + 2y = 4$

Answer: (A) $x - y = 1$ · Key from source paper

Q78 JEE Main 2021 · 25 Feb · Shift 1 MCQ

A tangent is drawn to the parabola $y^2 = 6x$ which is perpendicular to the line $2x + y = 1$. Which of the following points does NOT lie on it?

(A) $(0, 3)$
(B) $(4, 5)$
(C) $(5, 4)$
(D) $(-6, 0)$

Answer: (C) $(5, 4)$ · Key from source paper

Q79 JEE Main 2021 · 25 Feb · Shift 2 Numerical

A line is a common tangent to the circle $(x-3)^2+y^2=9$ and the parabola $y^2=4x$. If the two points of contact (a, b) and (c, d) are distinct and lie in the first quadrant, then $2(a+c)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q80 JEE Main 2021 · 24 Feb · Shift 1 MCQ

The locus of the mid-point of the line segment joining the focus of the parabola $y^2=4ax$ to a moving point of the parabola, is another parabola whose directrix is:

(A) $x=a$
(B) $x=0$
(C) $x=-\frac{a}{2}$
(D) $x=\frac{a}{2}$

Answer: (B) $x=0$ · Key from source paper

Q81 JEE Main 2020 · 6 Sep · Shift 1 MCQ

Let L_1 be a tangent to the parabola $y^2=4(x+1)$ and L_2 be a tangent to the parabola $y^2=8(x+2)$ such that L_1 and L_2 intersect at right angles. Then L_1 and L_2 meet on the straight line:

(A) $\mathrm{x}+3=0$
(B) $2\mathrm{x}+1=0$
(C) $\mathrm{x}+2=0$
(D) $\mathrm{x}+2\mathrm{y}=0$

Answer: (A) $\mathrm{x}+3=0$ · Key from source paper

Q82 JEE Main 2020 · 5 Sep · Shift 1 MCQ

If the common tangent to the parabolas, $y^2=4\,x\ and\ x^2=4\,y$ also touches the circle, $x^2+y^2=c^2$, then c is equal to :

(A) $\frac{1}{2\sqrt{2}}$
(B) $\frac{1}{\sqrt{2}}$
(C) $\frac{1}{4}$
(D) $\frac{1}{2}$

Answer: (B) $\frac{1}{\sqrt{2}}$ · Key from source paper

Q83 JEE Main 2020 · 3 Sep · Shift 1 MCQ

Let P be a point on the parabola, $y^2 = 12x$ and N be the foot of the perpendicular drawn from P , on the axis of the parabola. A line is now drawn through the mid-point M of PN, parallel to its axis which meets the parabola at Q. If the $y-$intercept of the line NQ is $\frac{4}{3}$, then :

(A) $PN = 4$
(B) $MQ = \frac{1}{3}$
(C) $MQ = \frac{1}{4}$
(D) $PN = 3$

Answer: (C) $MQ = \frac{1}{4}$ · Key from source paper

Q84 JEE Main 2020 · 2 Sep · Shift 2 MCQ

The area (in sq. units) of an equilateral triangle inscribed in the parabola $y^2 = 8x$, with one of its vertices on the vertex of this parabola is

(A) $64\sqrt{3}$
(B) $256\sqrt{3}$
(C) $192\sqrt{3}$
(D) $128\sqrt{3}$

Answer: (C) $192\sqrt{3}$ · Key from source paper

Q85 JEE Main 2020 · 9 Jan · Shift 2 MCQ

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:

(A) $2x + y - 24 = 0$
(B) $x - 2y + 8 = 0$
(C) $x + 2y + 8 = 0$
(D) $2x - y - 24 = 0$

Answer: (B) $x - 2y + 8 = 0$ · Key from source paper

Q86 JEE Main 2020 · 8 Jan · Shift 1 MCQ

The locus of a point which divides the line segment joining the point $(0, -1)$ and a point on the parabola $x^2 = 4y$ internally in the ratio $1 : 2$ is:

(A) $9x^2 - 12y = 8$

(B) $9x^2 - 3y = 2$

(C) $x^2 - 3y = 2$

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

Answer: (A) $9x^2 - 12y = 8$ · Key from source paper

Q87 JEE Main 2020 · 8 Jan · Shift 2 Numerical

Let a line $y = mx (m > 0)$, intersect the parabola, $y^2 = x$, at a point P, other than the origin. Let the tangent to it at P, meet the x-axis at the point Q. If area $(\Delta OPQ) = 4$ square unit, then m is equal to

Numerical value type: the answer is a number.

Answer: 0.5. · Key from source paper

Q88 JEE Main 2020 · 7 Jan · Shift 1 MCQ

If $y = mx + 4$ is a tangent to both the parabolas, $y^2 = 4x$ and $x^2 = 2by$, then b is equal to

(A) -32

(B) -64

(C) -128

(D) 128

Answer: (C) -128 · Key from source paper

Q89 JEE Main 2019 · 12 Apr · Shift 2 MCQ

The equation of a common tangent to the curves, $y^2 = 16x$ and $xy = -4$, is:

(A) $x - 2y + 16 = 0$

(B) $x - y + 4 = 0$

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

(D) $x + y + 4 = 0$

Answer: (B) $x - y + 4 = 0$ · Key from source paper

Q90 JEE Main 2019 · 10 Apr · Shift 2 MCQ

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:

(A) $\frac{1}{2}$
(B) $\sqrt{2}$
(C) $\frac{1}{\sqrt{2}}$
(D) 2

Answer: (B) $\sqrt{2}$ · Key from source paper

Q91 JEE Main 2019 · 9 Apr · Shift 1 MCQ

If one end of a focal chord of the parabola, $y^2 = 16x$ is at $(1, 4)$, then the length of this focal chord is

(A) 24
(B) 25
(C) 22
(D) 20

Answer: (B) 25 · Key from source paper

Q92 JEE Main 2019 · 9 Apr · Shift 2 MCQ

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

(A) $8\pi\left(3 - 2\sqrt{2}\right)$
(B) $8\pi\left(2 - \sqrt{2}\right)$
(C) $4\pi\left(3 + \sqrt{2}\right)$
(D) $4\pi\left(2 - \sqrt{2}\right)$

Answer: (A) $8\pi\left(3 - 2\sqrt{2}\right)$ · Key from source paper

---

Q93 JEE Main 2019 · 8 Apr · Shift 2 MCQ

The tangent to the parabola $y^2 = 4x$ at the point where it intersects the circle $x^2 + y^2 = 5$ in the first quadrant, passes through the point:

(A) $\frac{1}{4}, \frac{3}{4}$
(B) $-\frac{1}{3}, \frac{4}{3}$
(C) $-\frac{1}{4}, \frac{1}{2}$
(D) $\frac{3}{4}, \frac{7}{4}$

Answer: (D) $\frac{3}{4}, \frac{7}{4}$ · Key from source paper

---

Q94 JEE Main 2019 · 12 Jan · Shift 1 MCQ

Let $P(4, -4)$ and $Q(9, 6)$ be two points on the parabola, $y^2 = 4x$ and let X be any point on the arc POQ of this parabola, where O is the vertex of this parabola, such that the area of ΔPXQ is maximum. Then this maximum area (in sq. units) is :

(A) $\frac{625}{4}$
(B) $\frac{75}{2}$
(C) $\frac{125}{4}$
(D) $\frac{125}{2}$

Answer: (C) $\frac{125}{4}$ · Key from source paper

Q95 JEE Main 2019 · 12 Jan · Shift 2 MCQ

The equation of a tangent to the parabola, $x^2 = 8y$, which makes an angle θ with the positive direction of $x-$ axis, is

(A) $y = x\tan\theta + 2\cot\theta$,
(B) $y = x\tan\theta - 2\cot\theta$,
(C) $x = y\cot\theta + 2\tan\theta$,
(D) $x = y\cot\theta - 2\tan\theta$,

Answer: (C) $x = y\cot\theta + 2\tan\theta$, · Key from source paper

Q96 JEE Main 2019 · 11 Jan · Shift 1 MCQ

Equation of a common tangent to the parabola $y^2 = 4x$ and the hyperbola $xy = 2$ is :

(A) $x + y + 1 = 0$
(B) $x - 2y + 4 = 0$
(C) $x + 2y + 4 = 0$
(D) $4x + 2y + 1 = 0$

Answer: (C) $x + 2y + 4 = 0$ · Key from source paper

Q97 JEE Main 2019 · 11 Jan · Shift 2 MCQ

If the area of the triangle whose one vertex is at the vertex of the parabola, $y^2 + 4\left(x - a^2\right) = 0$ and the other two vertices are the points of intersection of the parabola and y -axis, is 250 sq. units, then a value of 'a' is :

(A) $5\sqrt{5}$
(B) $5\left(2^{1/3}\right)$
(C) $(10)^{33}$
(D) 5

Answer: (D) 5 · Key from source paper

Q98 JEE Main 2019 · 10 Jan · Shift 1 MCQ

If the parabolas $y^2 = 4b(x - c)$ and $y^2 = 8ax$ have a common normal, then which one of the following is a valid choice for the ordered triad (a, b, c)?

(A) $(1, 1, 3)$
(B) $\left(\frac{1}{2}, 2, 0\right)$
(C) $\left(\frac{1}{2}, 2, 3\right)$
(D) All of above

Options (4) or (1) were accepted. More than one answer was accepted. · Key from source paper

Q99 JEE Main 2019 · 10 Jan · Shift 2 MCQ

The length of the chord of the parabola $x^2 = 4y$ having equation $x - \sqrt{2}y + 4\sqrt{2} = 0$ is

(A) $6\sqrt{3}$ units
(B) $8\sqrt{2}$ units
(C) $2\sqrt{11}$ units
(D) $3\sqrt{2}$ units

Answer: (A) $6\sqrt{3}$ **units** · Key from source paper

Q100 JEE Main 2019 · 9 Jan · Shift 1 MCQ

Axis of a parabola lies along x-axis. If its vertex and focus are at distances 2 and 4 respectively from the origin, on the positive x-axis then which of following points does not lie on it?

(A) $6, 4\sqrt{2}$
(B) $5, 2\sqrt{6}$
(C) $8, 6$
(D) $4, -4$

Answer: (C) $8, 6$ · Key from source paper

Q101 JEE Main 2019 · 9 Jan · Shift 1 MCQ

Equation of a common tangent to the circle, $x^2 + y^2 - 6x = 0$ and the parabola, $y^2 = 4x$ is:

(A) $2\sqrt{3}y = -x - 12$
(B) $\sqrt{3}y = x + 3$
(C) $\sqrt{3}y = 3x + 1$
(D) $2\sqrt{3}y = 12x + 1$

Answer: (B) $\sqrt{3}y = x + 3$ · Key from source paper

Q102 JEE Main 2019 · 9 Jan · Shift 2 MCQ

Let $A(4, -4)$ and $B(9, 6)$ be points on the parabola, $y^2 = 4x$. Let C be chosen on the arc AOB of the parabola, where O is the origin, such that the area of ΔACB is maximum. Then, the area (in sq. units) of ΔACB , is:

EdLoop JEE

(A) 32
(B) $31\frac{3}{4}$
(C) $30\frac{1}{2}$
(D) $31\frac{1}{4}$

Answer: (D) $31\frac{1}{4}$ · Key from source paper

Q103 JEE Main 2018 · 16 Apr · Online MCQ

Let P be a point on the parabola $x^2 = 4y$. If the distance of P from the center of the circle $x^2 + y^2 + 6x + 8 = 0$ is minimum, then the equation of the tangent to the parabola at P is

(A) $x + y + 1 = 0$
(B) $x + 4y - 2 = 0$
(C) $x + 2y = 0$
(D) $x - y + 3 = 0$

Answer: (A) $x + y + 1 = 0$ · Key from source paper

Q104 JEE Main 2018 · 15 Apr · Shift 1 MCQ

Two parabolas with a common vertex and with axes along x-axis and y-axis, respectively, intersect each other in the first quadrant. if the length of the latus rectum of each parabola is 3 , then the equation of the common tangent to the two parabolas is?

(A) $3(x + y) + 4 = 0$
(B) $8(2x + y) + 3 = 0$
(C) $4(x + y) + 3 = 0$
(D) $x + 2y + 3 = 0$

Answer: (C) $4(x + y) + 3 = 0$ · Key from source paper

Q105 JEE Main 2018 · 15 Apr · Shift 2 MCQ

Tangents drawn from the point $(-8, 0)$ to the parabola $y^2 = 8x$ touch the parabola at P and Q. If F is the focus of the parabola, then the area of the triangle PFQ (in sq. units) is equal to

(A) 48
(B) 32
(C) 24
(D) 64

Answer: (A) 48 · Key from source paper

Q106 JEE Main 2018 · 8 Apr · Offline MCQ

Tangent and normal are drawn at $P(16, 16)$ on the parabola $y^2 = 16x$, which intersect the axis of the parabola at A & B, respectively. If C is the center of the circle through the points P, A & B and

$\angle CPB = \theta$, then a value of $\tan\theta$ is:

(A) $\frac{4}{3}$

(B) $\frac{1}{2}$

(C) 2

(D) 3

Answer: (C) 2 · Key from source paper

Q107 JEE Main 2017 · 9 Apr · Online MCQ

If $y = mx + c$ is the normal at a point on the parabola $y^2 = 8x$ whose focal distance is 8 units, then $|c|$ is equal to:

(A) $8\sqrt{3}$

(B) $10\sqrt{3}$

(C) $2\sqrt{3}$

(D) $16\sqrt{3}$

Answer: (B) $10\sqrt{3}$ · Key from source paper

Q108 JEE Main 2017 · 8 Apr · Online MCQ

If the common tangents to the parabola, $x^2 = 4y$ and the circle, $x^2 + y^2 = 4$ intersect at the point P, then the distance of P from the origin (units), is:

(A) $2\left(3 + 2\sqrt{2}\right)$

(B) $3 + 2\sqrt{2}$

(C) $\sqrt{2} + 1$

(D) $2\left(\sqrt{2} + 1\right)$

Answer: (D) $2\left(\sqrt{2} + 1\right)$ · Key from source paper

---

Q109 JEE Main 2016 · 10 Apr · Online MCQ

P and Q are two distinct points on the parabola, $y^2 = 4x$, with parameters t and t_1, respectively. If the normal at P passes through Q, then the minimum value of t_1^2 , is

(A) 8

(B) 4

(C) 6

(D) 2

Answer: (A) 8 · Key from source paper

Q110 JEE Main 2016 · 3 Apr · Offline MCQ

Let P be the point on the parabola, $y^2 = 8x$ which is at a minimum distance from the center C of the circle $x^2 + (y+6)^2 = 1$. Then the equation of the circle, passing through C and having its center at P is

(A) $x^2 + y^2 - \frac{x}{4} + 2y - 24 = 0$
(B) $x^2 + y^2 - 4x + 9y + 18 = 0$
(C) $x^2 + y^2 - 4x + 8y + 12 = 0$
(D) $x^2 + y^2 - x + 4y - 12 = 0$

Answer: (C) $x^2 + y^2 - 4x + 8y + 12 = 0$ · Key from source paper

Q111 JEE Main 2015 · 11 Apr · Online MCQ

If PQ be a double ordinate of the parabola, $y^2 = -4x$, where P lies in the second quadrant. If R divides PQ in the ratio $2 : 1$, then the locus of R is:

(A) $3y^2 = -2x$
(B) $9y^2 = 4x$
(C) $9y^2 = -4x$
(D) $3y^2 = 2x$

Answer: (C) $9y^2 = -4x$ · Key from source paper

Q112 JEE Main 2015 · 4 Apr · Offline MCQ

Let O be the vertex and Q be any point on the parabola, $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio $1 : 3$, then the locus of P is

(A) $x^2 = 2y$
(B) $x^2 = y$
(C) $y^2 = x$
(D) $y^2 = 2x$

Answer: (A) $x^2 = 2y$ · Key from source paper

Q113 JEE Main 2014 · 19 Apr · Online MCQ

A chord is drawn through the focus of the parabola $y^2 = 6x$ such that its distance from the vertex of this parabola is $\frac{\sqrt{5}}{2}$, then its slope can be

EdLoop JEE

(A) $\frac{\sqrt{5}}{2}$
(B) $\frac{2}{\sqrt{3}}$
(C) $\frac{\sqrt{3}}{2}$
(D) $\frac{2}{\sqrt{5}}$

Answer: (A) $\frac{\sqrt{5}}{2}$ · Key from source paper

Q114 JEE Main 2014 · 12 Apr · Online MCQ

Two tangents are drawn from a point $(-2, -1)$ to the curve, $y^2 = 4x$. If α is the angle between them, then $|\tan\alpha|$ is equal to:

(A) $\frac{1}{3}$
(B) $\frac{1}{\sqrt{3}}$
(C) $\sqrt{3}$
(D) 3

Answer: (D) 3 · Key from source paper

Q115 JEE Main 2014 · 11 Apr · Online MCQ

Let L_1 be the length of the common chord of the curves $x^2 + y^2 = 9$ and $y^2 = 8x$, and L_2 be the length of the latus rectum of $y^2 = 8x$, then:

(A) $L_1 > L_2$
(B) $L_1 = L_2$
(C) $L_1 < L_2$
(D) $\frac{L_1}{L_2} = \sqrt{2}$

Answer: (C) $L_1 < L_2$ · Key from source paper

Q116 JEE Main 2014 · 6 Apr · Offline MCQ

The slope of the line touching both the parabolas $y^2 = 4x$ and $x^2 = -32y$ is

(A) $\frac{1}{8}$
(B) $\frac{2}{3}$
(C) $\frac{1}{2}$
(D) $\frac{3}{2}$

Answer: (C) $\frac{1}{2}$ · Key from source paper

Q117 JEE Main 2013 · 25 Apr · Online MCQ

A common tangent to the conics $x^2 = 6y$ and $2x^2 - 4y^2 = 9$ is :

(A) $x - y = \frac{3}{2}$
(B) $x + y = 1$
(C) $x + y = \frac{9}{2}$
(D) $x - y = 1$

Answer: (A) $x - y = \frac{3}{2}$ · Key from source paper

Q118 JEE Main 2013 · 23 Apr · Online MCQ

The point of intersection of the normals to the parabola $y^2 = 4x$ at the ends of its latus rectum is :

(A) $(0, 2)$
(B) $(3, 0)$
(C) $(0, 3)$
(D) $(2, 0)$

Answer: (B) $(3, 0)$ · Key from source paper

Q119 JEE Main 2013 · 22 Apr · Online MCQ

Statement-1: The line $x - 2y = 2$ meets the parabola, $y^2 + 2x = 0$ only at the point $(-2, -2)$.
Statement-2: The line $y = mx - \frac{1}{2m}$ $(m \neq 0)$ is tangent to the parabola, $y^2 = -2x$ at the point $\left(-\frac{1}{2m^2}, -\frac{1}{m}\right)$

(A) Statement-1 is true; Statement- 2 is false.
(B) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for statement-1.
(C) Statement-1 is false; Statement-2 is true.
(D) Statement-1 a true; Statement-2 is true; Statement-2 is not a correct explanation for statement-1.

Answer: (B) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for statement-1. · Key from source paper

Q120 JEE Main 2013 · 9 Apr · Online MCQ

Statement-1: The slope of the tangent at any point P on a parabola, whose axis is the axis of x and vertex is at the origin, is inversely proportional to the ordinate of the point P. Statement-2: The system of parabolas $y^2 = 4ax$ satisfies a differential equation of degree 1 and order 1.

(A) Statement-1 is true; Statement- 2 is true; Statement-2 is a correct explanation for statement-1.
(B) Statement-1 is true; Statement-2 is true; Statement- 2 is not a correct explanation for statement-1.
(C) Statement-1 is true; Statement- 2 is false.
(D) Statement-1 is false; Statement- 2 is true.

Answer: (B) Statement-1 is true; Statement-2 is true; Statement- 2 is not a correct explanation for statement-1. · Key from source paper

Q121 JEE Main 2013 · 7 Apr · Offline MCQ

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 $m^4 - 3m^2 + 2 = 0$.

(A) Statement - I is true; Statement - II is false.
(B) Statement - I is false; Statement - II is true.
(C) Statement - I is true; Statement - II is true; Statement - II is a correct explanation for statement - I.
(D) Statement - I is true; Statement - II is true; Statement - II is not a correct explanation for statement - I.

Answer: (D) Statement - I is true; Statement - II is true; Statement - II is not a correct explanation for statement - I. · Key from source paper

Q122 AIEEE 2012 · 26 May · Online MCQ

The chord PQ of the parabola $y^2 = x$, where one end P of the chord is at point $(4, -2)$, is perpendicular to the axis of the parabola. Then the slope of the normal at Q is

(A) -4
(B) $-\frac{1}{4}$
(C) 4
(D) $\frac{1}{4}$

Answer: (A) -4 · Key from source paper

Q123 AIEEE 2012 · 19 May · Online MCQ

The equation of the normal to the parabola, $x^2 = 8y$ at $x = 4$ is

(A) $x + 2y = 0$
(B) $x + y = 2$
(C) $x - 2y = 0$
(D) $x + y = 6$

Answer: (D) $x + y = 6$ · Key from source paper

Q124 AIEEE 2012 · 12 May · Online MCQ

The area of triangle formed by the lines joining the vertex of the parabola, $x^2 = 8y$, to the extremities of its latus rectum is

(A) 2
(B) 8
(C) 1
(D) 4

Answer: (B) 8 · Key from source paper

Q125 AIEEE 2012 · 7 May · Online MCQ

Statement 1: $y = mx - \frac{1}{m}$ is always a tangent to the parabola, $y^2 = -4x$ for all non-zero values of m. Statement 2: Every tangent to the parabola, $y^2 = -4x$ will meet its axis at a point whose abscissa is non-negative.

(A) Statement 1 is true, Statement 2 is true; Statement 2 is a correct explanation of Statement 1.
(B) Statement 1 is false, Statement 2 is true.
(C) Statement 1 is true, Statement 2 is false.
(D) Statement 1 is true, Statement 2 is not a correct explanation of Statement 1.

Answer: (D) Statement 1 is true, Statement 2 is not a correct explanation of Statement 1. · Key from source paper

Q126 AIEEE 2012 · Offline MCQ

Statement 1: An equation of a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4$ is $y = 2x + 2\sqrt{3}$. Statement 2: If the line $y = mx + \frac{4\sqrt{3}}{m}$, $(m \neq 0)$ is a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4$, then m satisfies $m^4 + 2m^2 = 24$.

(A) Statement 1 is false, statement 2 is true
(B) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1
(C) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation for statement 1
(D) Statement 1 is true, statement 2 is false

Answer: (B) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1 · Key from source paper

Q127 AIEEE 2010 MCQ

If two tangents drawn from a point P to the parabola $y^2 = 4x$ are at right angles, then the locus of P is

(A) $2x + 1 = 0$
(B) $x = -1$
(C) $2x - 1 = 0$
(D) $x = 1$

Answer: (B) $x = -1$ · Key from source paper

Q128 AIEEE 2008 MCQ

A parabola has the origin as its focus and the line $x = 2$ as the directrix. Then the vertex of the parabola is at

(A) $(0, 2)$
(B) $(1, 0)$
(C) $(0, 1)$
(D) $(2, 0)$

Answer: (B) $(1, 0)$ · Key from source paper

Q129 AIEEE 2007 MCQ

The equation of a tangent to the parabola $y^2 = 8x$ is $y = x + 2$. The point on this line from which the other tangent to the parabola is perpendicular to the given tangent is

(A) $(-1, 1)$
(B) $(0, 2)$
(C) $(2, 4)$
(D) $(-2, 0)$

Answer: (D) $(-2, 0)$ · Key from source paper

Q130 AIEEE 2006 MCQ

The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is

(A) $xy = \frac{105}{64}$
(B) $xy = \frac{3}{4}$
(C) $xy = \frac{35}{16}$
(D) $xy = \frac{64}{105}$

Answer: (A) $xy = \frac{105}{64}$ · Key from source paper

Q131 AIEEE 2005 MCQ

Let P be the point $(1, 0)$ and Q a point on the locus $y^2 = 8x$. The locus of mid point of PQ is

(A) $y^2 - 4x + 2 = 0$
(B) $y^2 + 4x + 2 = 0$
(C) $x^2 + 4y + 2 = 0$
(D) $x^2 - 4y + 2 = 0$

Answer: (A) $y^2 - 4x + 2 = 0$ · Key from source paper

EdLoop JEE

Q132 AIEEE 2004 MCQ

If $a \neq 0$ and the line $2bx + 3cy + 4d = 0$ passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$, then

(A) $d^2 + (2b + 3c)^2 = 0$
(B) $d^2 + (3b + 2c)^2 = 0$
(C) $d^2 + (2b - 3c)^2 = 0$
(D) $d^2 + (3b - 2c)^2 = 0$

Answer: (A) $d^2 + (2b + 3c)^2 = 0$ · Key from source paper

Q133 AIEEE 2003 MCQ

The normal at the point $(bt_1^2, 2bt_1)$ on a parabola meets the parabola again in the point $(bt_2^2, 2bt_2)$, then

(A) $t_2 = t_1 + \frac{2}{t_1}$
(B) $t_2 = -t_1 - \frac{2}{t_1}$
(C) $t_2 = -t_1 + \frac{2}{t_1}$
(D) $t_2 = t_1 - \frac{2}{t_1}$

Answer: (B) $t_2 = -t_1 - \frac{2}{t_1}$ · Key from source paper

Q134 AIEEE 2002 MCQ

Two common tangents to the circle $x^2 + y^2 = 2a^2$ and parabola $y^2 = 8ax$ are

(A) $x = \pm(y + 2a)$
(B) $y = \pm(x + 2a)$
(C) $x = \pm(y + a)$
(D) $y = \pm(x + a)$

Answer: (B) $y = \pm(x + 2a)$ · Key from source paper

EdLoop JEE