

PART 1 - MATHEMATICS

Topic : Conic sections, Application of integrals

SECTION-A : (Maximum Marks : 4)

This section contains **ONE** question.

Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.

For each question, choose the option corresponding to the correct answer.

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct option is chosen;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -1 In all other cases.

1. Consider the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. Let $S(p, q)$ be a point in the first quadrant such that $\frac{p^2}{9} + \frac{q^2}{4} > 1$. Two tangents are drawn from S to the ellipse, of which one meets the ellipse at one end point of the minor axis and the other meets the ellipse at a point T in the fourth quadrant. Let R be the vertex of the ellipse with positive x -coordinate and O be the center of the ellipse. If the area of the triangle ΔORT is $\frac{3}{2}$, then which of the following options is correct?

[JEE Advanced 2024 Paper 1]

- (A) $q = 2, p = 3\sqrt{3}$ (B) $q = 2, p = 4\sqrt{3}$ (C) $q = 1, p = 5\sqrt{3}$ (D) $q = 1, p = 6\sqrt{3}$

Scan or tap for the
full solution



Space for Rough Work

SECTION-B : (Maximum Marks : 8)

This section contains **ONE** paragraph.

Based on each paragraph, there are **TWO** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) in the place designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

Paragraph for Questions 2 and 3

Consider the ellipses given by

$$x^2 + 4y^2 = 1 \text{ and } 4x^2 + y^2 = 1.$$

2. Let P be the point in the first quadrant where the given ellipses intersect. If θ is the acute angle between the tangents to the given ellipses at the point P, then the value of $4\tan \theta$ is _____.

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3. If α is the area of the common region that lies inside both the given ellipses, then the value of $\cot \alpha$ is _____.

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Scan or tap for the
full solution



Space for Rough Work

JEE ADVANCED CONIC SECTIONS — ELLIPSE: TANGENT AND NORMAL (JEE) — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION-A

[illegible]

SECTION-B

Ques.	2	3								
Ans.	7.4 to 7.6	0.74 to 0.76								