

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?

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(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
 $x^2 + 4y^2 = 1$ 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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full solution



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

[illegible]