FIITJEE

Diagnostic cum Scholarship Tests
SAMPLE PAPER
For Students of Class IX

Paper 4

Mathematical Olympiad

Duration : 60 minutes   **Paper Code: 89-4**   *Maximum Marks : 96*

Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Question Paper Code as indicated at the top of this sheet (Side 2) into the corresponding columns / fields on the OMR sheet before proceeding with the paper. Incorrectly filled information regarding the class or paper may result in inaccurate outcomes or results.

> *"This paper has been scientifically designed to evaluate your potential – manifested and hidden for the target examinations mentioned in various sections of the paper. Thus, your adherence to the instructions is critical in the evaluation of the same"*

1. This Question paper consists of only 1 section.

2. Student should devote allotted time for each section. If a section is easy, then it is easy for everyone & was meant to be like that with a goal in mind. Do not switch over to another section if you find the section to be easy. If a section is tough, then it is tough for everyone. You are advised to spend 60 Minutes on Section-I. This adherence is crucial for assessing your true potential, as this section is meticulously crafted to evaluate your potential for the corresponding competitive examinations.

3. Sheets will be given to each candidate for rough work. Candidate must fill all details on the rough sheet and submit the same to invigilator along with OMR sheet. Candidate must mention the Question No. while doing the rough work in the sheet.

4. Please note candidates are not allowed to bring any prohibited items into the exam hall such as electronic devices, mobile phones, smart watch, earphones, calculators, books, notes, formula sheets, and bags.

5. Marking scheme is given in table below:

Section	Subject	Question no.	Marking Scheme for each question	
			Correct answer	**Wrong answer**
SECTION – I (Mathematical Olympiad) **Time Allotted: 60 Minutes**	MATHEMATICS (PART-A)	1 to 16	**+3**	**–1**
	MATHEMATICS (PART-B)	17 to 24	**+6 * Partial Marking**	**0**

* Partial Marking: (Q. No. 17 to 24):

|		
Full Marks	**: +6**	If only (all) the correct option(s) is(are) chosen;
Partial Marks	**: +4.5**	If all the four options are correct but ONLY three options are chosen;
Partial Marks	**: +3**	If three or more options are correct but ONLY two options are chosen, both of which are correct;
Partial Marks	**: +1.5**	If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	**: 0**	If unanswered/incorrect option(s) chosen;

Section – I

Time: 60 Minutes

MATHEMATICS – (PART – A)

*This part contains **16 Multiple Choice Questions** number **1 to 16.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*
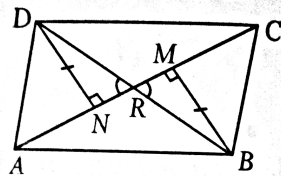
1. In the given figure, PQR is an equilateral triangle and QRST is a square. Then $\angle PSR =$
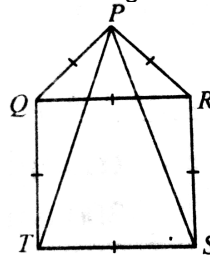
   (A) 30^0 (B) 15^0
   (C) 90^0 (D) 60^0

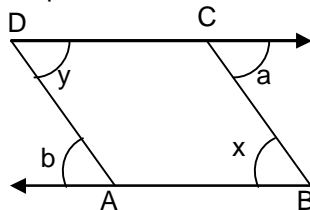2. In quadrilateral ABCD, BM and DN are drawn perpendicular to AC such that BM = DN. If BR = 8 cm, then BD is

   (A) 4 cm   (B) 2 cm
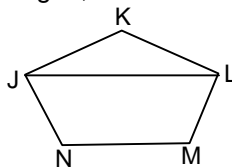   (C) 12 cm   (D) 16 cm

3. In figure, sides BA and CD of the quadrilateral ABCD are produced and AB || CD, then

   (A) $a + x = b - y$ (B) $a + b = x + y$
   (C) $a + b = x - y$ (D) None of these

4. If the figure JKLMN is a regular pentagon, find $\angle JLM$.

   (A) 36^0 (B) 72^0
   (C) 108^0 (D) None of these

5. The simplified form of $\sqrt{125} + \sqrt{245} - \sqrt{845}$ is
   (A) $\sqrt{15}$ (B) $2\sqrt{5}$
   (C) $-\sqrt{5}$ (D) $-2\sqrt{5}$

6. If $\sqrt{2^n} = 1024$, then $3^{2\left[\frac{n}{4}-4\right]} = ?$
   (A) 3 (B) 9
   (C) 27 (D) 81

7. Value of $\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}}}}}....\infty$ is
   (A) $\frac{81}{64}$ (B) $\frac{9}{8}$
   (C) $\frac{3}{2}$ (D) $\frac{3}{2\sqrt{2}}$

8. If $x = 2^{1/3} - 2$ then $x^3 + 6x^2 + 12x = ?$
   (A) 6 (B) –6
   (C) 8 (D) –8

9. The absolute value of $|4 - x| + |x - 4|$, if $0 < x < 4$ is
   (A) 0 (B) 2x
   (C) 8 (D) 2(4 - x)

10. A father tells his son "I was of your present age when you were born." If the father is 36 now how old was the son five year back?
    (A) 13 (B) 15
    (C) 17 (D) 18

11. If $3a = 4b = 6c$ and $a + b + c = 27\sqrt{29}$ then, $\sqrt{a^2 + b^2 + c^2}$ is
    (A) $3\sqrt{29}$ (B) 81
    (C) 87 (D) None of these

12. If $a = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $b = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, the value of $\left(\frac{a^2 + ab + b^2}{a^2 - ab + b^2}\right)$ is
    (A) $\frac{3}{4}$ (B) $\frac{4}{3}$
    (C) $\frac{3}{5}$ (D) $\frac{5}{3}$

13. If $\sqrt{0.04 \times 0.4 \times a} = 0.004 \times 0.4 \times \sqrt{b}$, then $\frac{a}{b}$ is
    (A) 16×10^{-3} (B) 16×10^{-4}
    (C) 16×10^{-5} (D) None of these

14. What number should be divide by $\sqrt{0.25}$ to give the result as 25?
    (A) 12.5 (B) 25
    (C) 50 (D) 125

15.   The length of a minute hand of a wall clock is 8.4 cm. Find the area swept by it in 10 minutes.
        (A) 36.96 cm^2 (B) 110.88 cm^2
        (C) 120 cm^2 (D) 130 cm^2

16.   A polyhedron whose base is a polygon with any number of sides and whose other faces are triangular with common vector
        (A) prism   (B) pyramid
        (C) cube   (D) none of these

MATHEMATICS – (PART – B)

*This part contains **8 Multiple Choice Multi Correct Type Questions** number **17 to 24**. Each question has 4 choices (A), (B), (C) and (D), out of which **MORE THAN ONE** are correct.*

17.   Find the integers satisfying the equation $|2x| - |x - 4| = x + 4$

        (A) −4   (B) 4
        (C) 5   (D) −5

18.   If $x = \sqrt{3 + 2\sqrt{2}}$, then :

        (A) $x + \dfrac{1}{x} = 2\sqrt{2}$ (B) $x - \dfrac{1}{x} = 2$

        (C) $x^4 + \dfrac{1}{x^4} = 34$ (D) $x^4 - \dfrac{1}{x^4} = 24\sqrt{2}$

19.   If $x^2 + \dfrac{1}{x^2} = 27$, then

        (A) $x + \dfrac{1}{x} = 5$ (B) $x + \dfrac{1}{x} = \sqrt{29}$

        (C) $x + \dfrac{1}{x} = -\sqrt{29}$ (D) $x + \dfrac{1}{x} = -5$

20.   If $a^m \times a^n = a^{mn}$ then which of the following is/are true?
        (A) m(n − 2) + n(m − 2) = 0   (B) m(n − 2) + n(m − 2) = −2
        (C) $\dfrac{1}{m} + \dfrac{1}{n} = 2$ (D) $\dfrac{1}{m} + \dfrac{1}{n} = 1$

21.   If $1^x + 5^x + 8^x + 12^x = 2^x + 3^x + 10^x + 11^x$, then x =
        (A) 0   (B) 1
        (C) 2   (D) 3

22.   A solid cube is cut into two cuboids of equal volumes. The ratio of the total surface area of the given cube and that of one of the cuboids is :
        (A) $6a^2 : 4a^2$ (B) $4a^2 : 6a^2$
        (C) 3 : 2   (D) 2 : 3

23. The weight of a lead pipe 3.5 m long, if the external diameter of the pipe is 2.4 cm, the thickness of the lead is 2 mm and 1 cubic cm of lead weight 11 gm is
    (A) (484×11) gm
    (B) 5.324 kg
    (C) 5 kg
    (D) $\pi(2.2)(0.2)(350)(11)$ gm

24. The point for which the abscissa and ordinate have same signs will lie in
    (A) Quadrant I
    (B) Quadrant II
    (C) Quadrant III
    (D) Quadrant IV

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ANSWER KEY

1.	**B**	2.	**D**	3.	**B**	4.	**B**
5.	**C**	6.	**B**	7.	**A**	8.	**B**
9.	**D**	10.	**A**	11.	**C**	12.	**B**
13.	**C**	14.	**A**	15.	**A**	16.	**B**
17.	**A, B, C**	18.	**A, B, C, D**	19.	**B, C**	20.	**A, D**
21.	**A, B, C, D**	22.	**A, C**	23.	**A, B, D**	24.	**A, C**