

Diagnostic cum Scholarship Tests SAMPLE PAPER For Students of Class X

Paper 4

Mathematical Olympiad

Duration : 60 minutes

Paper Code: 910-4

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;

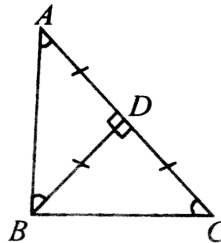
Section - I

Time: 60 Minutes

MATHEMATICS - (PART - A)

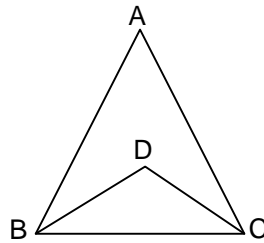
This part contains **16 Multiple Choice Questions** number 1 to 16. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. In the given figure, $BD \perp AC$, the measure of $\angle ABC$ is



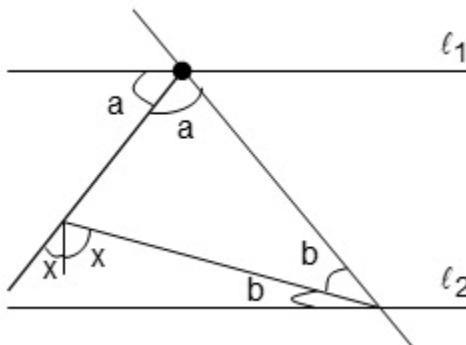
- (A) 60°
(B) 30°
(C) 45°
(D) 90°

2. If the given figure, if $AB = AC$ and $DB = DC$, then the ratio of $\angle ABD$ to $\angle ACD$ is



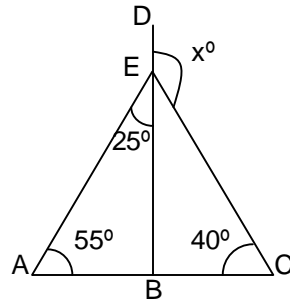
- (A) 1 : 2
(B) 2 : 1
(C) 1 : 1
(D) 1 : 3

3. If $l_1 \parallel l_2$, then value of x is



- (A) $22\frac{1}{2}$
(B) $\frac{\pi}{2}$
(C) 60°
(D) $\frac{\pi}{4}$

4. In given figure, find the value of x.



- (A) 65° (B) 80°
 (C) 95° (D) 120°
5. The marked price of an article is Rs. 1250 and the shopkeeper allows a discount of 6% on it. Then selling price is
 (A) 1244 Rs. (B) 1325 Rs.
 (C) 1175 Rs. (D) 1400 Rs.
6. If $25^{x+1} = \frac{25}{5^x}$ then the value of x is
 (A) 2 (B) 0
 (C) 1 (D) 3
7.
$$\frac{(875)^2 - (874)^2 - 49}{(90)^2 - (80)^2}$$

 (A) 50 (B) 170
 (C) 0 (D) 1
8. If one of the factors of $6x^2 + 84x - 306$ is $x - 3$. The other factor will be
 (A) $6(x + 5)$ (B) $6(x + 3)$
 (C) $6(x + 17)$ (D) $3(x + 4)$
9. If $y = 3^{1/3} + 3$. Then $y^3 - 9y^2 + 27y = ?$
 (A) 40 (B) 30
 (C) 50 (D) 60
10. If $a + b + c = 4$ and $a^2 + b^2 + c^2 = 14$, then $ab + bc + ca = ?$
 (A) -2 (B) 0
 (C) 4 (D) 1
11. Find m if $\left[\left\{ \left(\frac{1}{7^2} \right)^{-2} \right\}^{-1/3} \right]^{1/4} = 7^m$
 (A) $\frac{1}{4}$ (B) $-\frac{1}{3}$
 (C) -3 (D) 2
12. The factorisation of $(m + n)^2 - 4mn - 16p^2$ gives
 (A) $(m + n + 4p)(m + n - 4p)$ (B) $(m - n + 4p)(m - n - 4p)$
 (C) $(m - n - 4p)(m + n + 4p)$ (D) $(m + n + 2p)(m - n - 2p)$

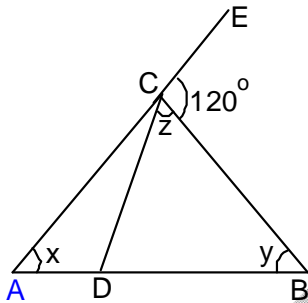
13. $\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{4}\right)\left(1 - \frac{1}{5}\right)\dots\left(1 - \frac{1}{n}\right) = ?$
- (A) $\frac{1}{n}$ (B) $\frac{2(n-1)}{n}$
 (C) $\frac{2}{n}$ (D) $\frac{2}{n(n+1)}$
14. $\frac{(967 + 289)^2 + (967 - 289)^2}{[967 \times 967 + 289 \times 289]} = ?$
- (A) 1256 (B) 678
 (C) 2 (D) 1
15. $\sqrt{11 + 6\sqrt{2}}$ equals
- (A) $2 + \sqrt{3}$ (B) $3 + \sqrt{2}$
 (C) $6 + \sqrt{5}$ (D) $4 + \sqrt{3}$
16. If $2^a = 3^b = 6^{-c}$, find $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$
- (A) 1 (B) -1
 (C) $\frac{1}{2}$ (D) 0

MATHEMATICS – (PART – B)

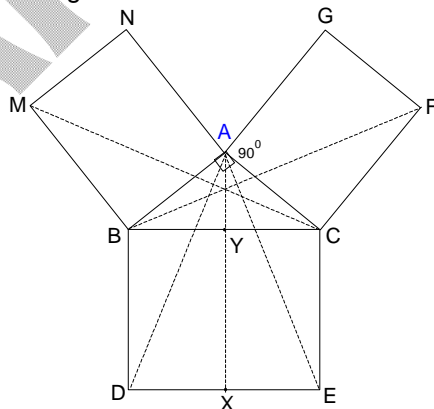
This part contains 8 Multiple Choice Multi Correct Type Questions number 17 to 24. Each question has 4 choices (A), (B), (C) and (D), out of which MORE THAN ONE are correct.

17. Which of the following statement(s) is(are) true ?
- (A) If $a = \frac{1}{3 - 2\sqrt{2}}$, $b = \frac{1}{3 + 2\sqrt{2}}$, then $a^2b + ab^2 = 6$
 (B) If $x = \sqrt{31 + 8\sqrt{15}}$, then $x + \frac{1}{x} = 8$.
 (C) $\frac{22}{7}$ is an irrational number
 (D) π is a rational number
18. Consider two polynomials
 $p(x) = 1 - x + x^2 - x^3$
 $q(x) = 3 + \sqrt{2}y - 2\sqrt{2}y^4$
 Which of the following are true?
- (A) $p(1) > q(0)$ (B) $p(-1) > q(1)$
 (C) $p(2) > q(\sqrt{2})$ (D) $p(-2) > q(-\sqrt{2})$

19. Let $g(x) = x^6 + ax^5 + bx^4 + cx^3 + dx^2 + ex + f$ be a polynomial such that $g(1) = 1, g(2) = 2, g(3) = 3, g(4) = 4, g(5) = 5$ and $g(6) = 6$. And if $g(7) = n$
- (A) sum of the digits of n is 16
(B) sum of the digits of n is 14
(C) last digit of n is 7
(D) last digit of n is 9
20. The points $(2, 3), (0, 2), (4, 5)$ and $(0, t)$ are concyclic of 't' is
- (A) 1
(B) 2
(C) 17
(D) 3
21. Given that system of equations $kx + 3y = 10, 2x - 3y = 0$ has integer solution (i.e. both x & y are integers). Then, value of 'k' can be
- (A) -1
(B) 3
(C) 1
(D) -3
22. In the given figure, $AD = CD = BC$, then



- (A) $x = 40^\circ$
(B) $y = 80^\circ$
(C) $z = 40^\circ$
(D) $x = 60^\circ$
23. In a class of 30 students, some students play football while some other play hockey. One of the students was selected randomly, what is the probability that the student play hockey?
- (A) $\frac{5}{6}$
(B) $\frac{1}{2}$
(C) 0
(D) 1
24. In the given figure. ABC is a right triangle right – angled at A, BCED, ACED, ACFG and ABMN are squares on the sides BC, CA and AB respectively. Line segment $AX \perp DE$ meets BC at Y.



- (A) $\Delta MBC \cong \Delta ABD$
(B) $\text{ar}(CYXE) = \text{ar}(ACFG)$
(C) $\text{ar}(BYXD) = 2\text{ar}(\Delta MBC)$
(D) only (A) and (B)

FIITJEE

Diagnostic cum Scholarship Tests

SAMPLE PAPER

For Students of Class X

Paper 4

Mathematical Olympiad

Paper Code: 910-4

ANSWER KEY

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