

SIKSHAM

Mathematics | Computer | Coding & Programming

ADVANCED MOCK ASSESSMENT - X**Mathematics****Time Allowed: 1 Hour 30 Minutes****Maximum Marks: 50 (Written: 45 + Viva: 5)****General Instructions:**

- All questions are compulsory.
- Read all questions carefully before attempting.
- Section A contains 10 Multiple Choice Questions (1 mark each).
- Section B contains 5 Short Answer Type-I questions (2 marks each).
- Section C contains 5 Long Answer Type-I questions (3 marks each).
- Section D contains 2 Long Answer Type-II questions (5 marks each).
- Section E contains a 5-mark Viva-Voce oral evaluation sequence.

SECTION A (10 MARKS)**1. Choose the correct answer from the given four options: [1×10=10]**

a. If the product of two numbers is 1080 and their HCF is 30, then their corresponding LCM value is:

- (i) 180 (ii) 36
(iii) 240 (iv) 108

b. The physical graph of a quadratic polynomial $y = ax^2 + bx + c$ opens downwards in a U-shape format when:

- (i) $a > 0$ (ii) $a < 0$
(iii) $a = 0$ (iv) $a = 1$

c. At what precise geographic coordinate does the linear equation line $4x + 3y = 12$ intersect the x-axis?

- (i) (0, 4) (ii) (3, 0)
(iii) (4, 0) (iv) (0, 3)

d. If one zero of a quadratic polynomial of the form $x^2 - kx + 6 = 0$ is 2, the other zero value is:

- (i) 3 (ii) 4
(iii) 1 (iv) -3

e. If the linear equations system $3x + y = 1$ and $(2k - 1)x + (k - 1)y = 2k + 1$ is completely inconsistent, then k equals:

- (i) 1 (ii) 2
(iii) -1 (iv) 0

f. A quadratic equation with real coefficients has equal roots if its discriminant block value satisfies:

- (i) $D > 0$ (ii) $D = 0$
 (iii) $D < 0$ (iv) $D \geq 1$

g. What is the maximum number of intersection coordinates that a pair of linear intersecting lines can share?

- (i) zero (ii) one
 (iii) two (iv) infinite

h. The value of c for which the quadratic equation $2x^2 - 4x + c = 0$ has real roots is:

- (i) $c \leq 2$ (ii) $c \geq 2$
 (iii) $c = 4$ (iv) $c > 4$

i. The nature of zeroes of the quadratic polynomial $x^2 + 99x + 127$ are:

- (i) both positive (ii) both negative
 (iii) one positive, one negative (iv) both equal

j. If $LCM(77, 99) = 693$, then the value of $HCF(77, 99)$ corresponds to:

- (i) 11 (ii) 7
 (iii) 9 (iv) 22

SECTION B (10 MARKS)

2. Find the largest positive integer that divides 70 and 125, leaving remainders 5 and 8 respectively. [2]

3. Find a quadratic polynomial whose sum of zeroes is $\frac{-1}{4}$ and product of zeroes is $\frac{1}{4}$. [2]

4. Solve the following pair of simultaneous linear equations by substitution method: [2]

$$\begin{aligned}x + y &= 14 \\x - y &= 4\end{aligned}$$

5. Find the discriminant values of the quadratic equation $3x^2 - 2x + \frac{1}{3} = 0$ and determine the explicit nature of its roots. [2]

6. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer. [2]

SECTION C (15 MARKS)

7. Prove that $\sqrt{3}$ is an irrational number by the standard method of contradiction. [3]

8. Find the zeroes of the quadratic polynomial $4x^2 - 4x - 3$ and verify the relation between its zeroes and coefficients. [3]

9. For what values of a and b does the following pair of linear equations possess an infinite number of solutions? [3]

$$\begin{aligned}2x + 3y &= 7 \\(a - b)x + (a + b)y &= 3a + b - 2\end{aligned}$$

10. Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by applying the Sridharacharya Quadratic Formula. [3]
11. If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is the reciprocal of the other zero, find the exact value of parameter a . [3]

SECTION D (10 MARKS)

12. The sum of a two-digit number and the number obtained by reversing the order of its digits is 66. If the digits of the number differ by 2, find the original number. [5]
13. Is it possible to design a rectangular mango grove whose length is twice its breadth and the total internal area is 800 square meters? If so, find its length and breadth. [5]

SECTION E (5 MARKS — VIVA VOCE ASSESSMENT LOOP)

14. Answer the following conceptual questions during oral evaluation: [1×5=5]
1. State Euclid's Division Lemma statement criteria for positive integers.
 2. What geometric feature occurs when the discriminant value of a quadratic equation is zero? Where does it touch the axis?
 3. Define what makes a system of equations consistent versus inconsistent.
 4. Can a cubic polynomial have exactly two real zeroes? Explain via curve intersection behavior.
 5. What is the fundamental difference between an algebraic expression identity and a quadratic equation statement?

--- END OF EXAM PAPER ---