

MATHEMATICS TEST –BEFORE PRE BOARD-DAY 02**STD –X****DATE-28/11/2025 (PART II)****TIME 50 MIN****MM 26**

(1)(i) Prove that 8^n never ends with the digit, where $n \in \mathbb{N}$.

(ii) Prove that $6 + 2\sqrt{3}$ is an irrational number.

(2) If α and β are the zeros of the quadratic polynomial $f(x) = 2x^2 - 5x + 7$, find a polynomial whose zeros are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.

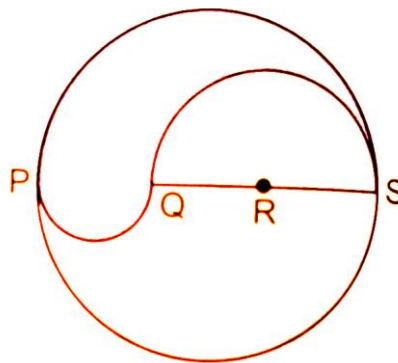
(3) If $ad \neq bc$, then prove that the equation $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots.

(4) Solve for x : $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}, x \neq 1, 2, 3$

(5) If the points $A(-2,1), B(a,b)$ and $C(4,-1)$ are collinear and $a - b = 1$, find the values of a and b .

(6) Point P divides the line segment joining the points $A(2,1)$ and $B(5,-8)$ such that $\frac{AP}{PB} = \frac{1}{3}$. If P lies on the line $2x - y + k = 0$, find the value of k .

(7) PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semicircles are drawn on PQ and QS as diameters as shown in fig. Find the perimeter and area of the shaded region.



(8) The median of the distribution given below is 28.5, find the values of x and y .

CLASS INTERVAL	0-10	10-20	20-30	30-40	40-50	50-60	TOTAL
FREQUENCY	5	X	20	15	Y	5	60

(9) A number x is selected at random from the numbers 1,2,3,4. Another number y is selected at random from the numbers 1,4,9 and 16. Find the probability that product of x and y is less than 16.