



B K BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS

A CBSE DAY-CUM BOYS' RESIDENTIAL SCHOOL

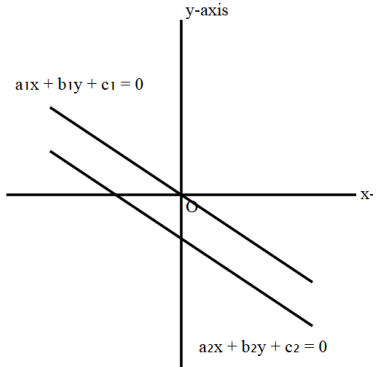
PERIODIC TEST-1 (2026-27)

MATHEMATICS (041)

GRADE X SET-01



SECTION A

1.	The pair of linear equations $x + 2y + 5 = 0$, $-3x - 6y + 1 = 0$ have a. A unique solution b. Exactly two solution c. Infinite many solution d. No solution	1
2.	The lines representing the given pair of equation are non-intersecting. which of the following statement is not true a. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ b. $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ c. $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ d. $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	1
		
	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	
3.	Aman solved a quadratic equation and found its root to be real. Which of these could represent the graph of equation aman solved. a. Only iii and ii b. Only iii and ii and iv c. only I d. only I, ii	1
4.	The Nature of roots of the equation $x^2 + x + 1$ are a. Real roots b. Equal roots c. not real roots d. real and equal roots both	1
5.	The Product of roots of the equation $x^2 - 6x + 2 = 0$ is a. 2 b. -2 c. 6 d. -6	1
6.	This is a Assertion and Reason based question . Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason	1

	(R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. - Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). - Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). - Assertion (A) is true, but Reason (R) is false. - Assertion (A) is false, but Reason (R) is true. Assertion (A) : $x = 1, y = 1$ is a solution of pair of equation $4x - 3y = 1; 5x - 7y = -2$. Reason (R) : A pair of values (x, y) satisfying each one of equation in a given system of two simultaneous linear equation in x and y is called solution of system of equation.	
	Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	

SECTION – {B}

(This section comprises of very short answer type questions (VSA) of 2 mark each)

7.	Given the linear equation $2x + 3y - 8 = 0$. Write another linear equations in two variables such that geometric representation of the pair so formed is - Intersecting lines - Consistent lines.	2
	Answer varies from student to student	
8.	Find the nature of roots of the quadratic equation and if real find roots $2x^2 - 3x + 5 = 0$	2
	$D = b^2 - 4ac$ Substituting the values: $D = (-3)^2 - 4(2)(5)$ $D = 9 - 40$ $D = -31$	

SECTION – {C}

(This section comprises of short answer type questions (SA) of 3 mark each)

9.	Out of a number of saras birds, one-fourth of the number are moving about in lotus plants, $\frac{1}{9}$ th coupled along with $\frac{1}{4}$ th as well as 7 times the square root of the number move on a hill. 56 birds remain in vakula trees. What is the total number of birds?	3
	Let, the total number of Saras birds be x. $\therefore$ Number of birds moving about in lotus plants $= \frac{x}{4}$ Number of birds moving on a hill $\frac{x}{9} + \frac{x}{4} + 7\sqrt{x}$ Number of birds remaining in Vakula trees = 56 $\therefore \frac{x}{4} + \frac{x}{9} + \frac{x}{4} + 7\sqrt{x} + 56 = x$ $\Rightarrow x - \frac{x}{4} - \frac{x}{9} - \frac{x}{4} = 7\sqrt{x} + 56$ $\Rightarrow \frac{36x - 9x - 4x - 9x}{36} = 7\sqrt{x} + 56$ $\Rightarrow \frac{14x}{36} = 7\sqrt{x} + 56$ $\Rightarrow \frac{x}{18} = \sqrt{x} + 8$ $\Rightarrow x - 18\sqrt{x} - 144 = 0 \quad \dots\dots (1)$ Let $\sqrt{x} = y$, then (1) becomes $y^2 - 18y - 144 = 0$ $(y - 24)(y + 6) = 0$ $\therefore y = 24$ or $y = -6$ $\Rightarrow \sqrt{x} = 24$ or $\sqrt{x} = -6$ but square root of a positive number cannot be negative. So, we reject $\sqrt{x} = -6$ $\therefore \sqrt{x} = 24 \Rightarrow x = 576 \quad (\text{on squaring})$	
10.	Find the value of c for which the quadratic equation $(c + 1)x^2 - 6(c + 1)x + 3(c + 9) = 0$; $c \neq -1$, has equal roots.	3

	$(c + 1)x^2 - 6(c + 1)x + 3(c + 9) = 0$ Comparing the above equation with $ax^2 + bx + c = 0$, we get $a = (c + 1), b = -6(c + 1), c = 3(c + 9)$ $\therefore \Delta = b^2 - 4ac$ $= [-6(c + 1)]^2 - 4(c + 1) \times 3(c + 9)$ $= 36(c + 1)^2 - 12(c + 1)(c + 9)$ $= 36(c^2 + 2c + 1) - 12(c^2 + 10c + 9)$ $= 36c^2 + 72c + 36 - 12c^2 - 120c - 108$ $= 24c^2 - 48c - 72$ For real and equal roots, we set $\Delta = 0$; Solve the quadratic equation using the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$: $x = \frac{490 \pm \sqrt{490^2 - 4 \cdot 9 \cdot 2000}}{2 \cdot 9}$ $x = \frac{490 \pm \sqrt{240100 - 72000}}{18}$ $x = \frac{490 \pm \sqrt{168100}}{18}$ $x = \frac{490 \pm 410}{18}$ $x = \frac{900}{18} = 50$	
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SECTION – {D}

(This section comprises of Log answer type questions (LA) of 5 mark each)

11.	Two water taps together can fill a tank in $22\frac{2}{9}$ minutes the tap of larger diameter takes 10 minutes less than the smaller one to fill the tank separately find the time in which each tap can separately fill the tank	5
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	To solve the equation, find a common denominator and solve for x: $\frac{(x-10)+x}{x(x-10)} = \frac{9}{200}$ $\frac{2x-10}{x^2-10x} = \frac{9}{200}$ $200(2x-10) = 9(x^2-10x)$ $400x-2000 = 9x^2-90x$ $9x^2-490x+2000 = 0$	
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SECTION – {E}

(This section comprises of CASE BASED questions (CBQ) of 4 mark)

12.	It is common that governments revise travel fares based on purchasing power for different vehicles like autos, rickshaws, taxis, radio cabs, etc. The auto charges in a city comprise a fixed charge plus a charge for the distance covered.  Study the following table: <table border="1"> <thead> <tr> <th>Name of the city</th><th>Distance travelled (KM)</th><th>Amount paid (in Rs.)</th></tr> </thead> <tbody> <tr> <td rowspan="2">Pune</td><td>10</td><td>75</td></tr> <tr> <td>15</td><td>110</td></tr> <tr> <td rowspan="2">Delhi</td><td>8</td><td>91</td></tr> <tr> <td>14</td><td>145</td></tr> </tbody> </table> I. If the fixed charge is Rs x and the running charge is Rs y per km, form a pair of linear equations representing the situation. (In Pune) II. If the fixed charge is Rs x and the running charge is Rs y per km, form a pair of linear equations representing the situation. (In Delhi) III. Find the amount to be paid for travelling 100 km in Pune. IV. Find the amount to be paid for travelling 60 km in Delhi	Name of the city	Distance travelled (KM)	Amount paid (in Rs.)	Pune	10	75	15	110	Delhi	8	91	14	145	4
Name of the city	Distance travelled (KM)	Amount paid (in Rs.)													
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Step 1

Let the fixed charge be x and the running charge per km be y .

Two data points for City A:

- 10 km costs Rs. 75
- 15 km costs Rs. 110

Form equations:

$$\begin{cases} x + 10y = 75 \\ x + 15y = 110 \end{cases}$$

Step 2

Subtract the first equation from the second:

$$(x + 15y) - (x + 10y) = 110 - 75$$

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$$15y - 10y = 35$$

$$5y = 35$$

$$y = 7$$

Step 3

Substitute $y = 7$ into the first equation:

$$x + 10(7) = 75$$

Step 3

Substitute $y = 7$ into the first equation:

$$x + 10(7) = 75$$

$$x + 70 = 75$$

$$x = 75 - 70 = 5$$

So, fixed charge $x = 5$ Rs, running charge per km $y = 7$ f

Step 4

Calculate cost for 50 km:

$$\text{Total cost} = x + y \times 50 = 5 + 7 \times 50 = 5 + 350 = 355$$