



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)

MARKING SCHEME SET-02



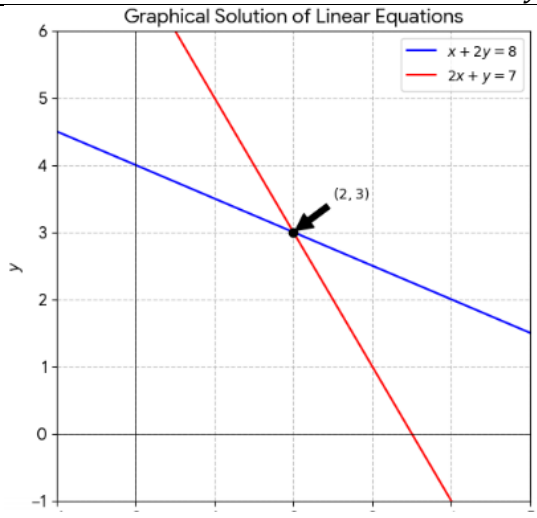
SECTION A

1.	The pair of linear equations $3x - 15y = 7$, $2x - 10y = \frac{14}{3}$ has a. A unique solution b. Exactly two solutions c. Infinitely many solution d. No solution	1
	c. Infinitely many solution	
2.	3. 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 real root not exist. Which of these could represent the graph of equation aman solved. a. Only ii b. Only iii and ii c. only I and ii d. only I , iii and iv	1
	Only ii	
4.	The Nature of roots of the equation $9x^2 - 6x - 2 = 0$ are a. 2 distinct real roots b. More than 2 roots c. not real roots d. real and equal roots both	1
	2 distinct real roots	
5.	The sum of roots of the equation $x^2 - 6x + 2 = 0$ is a. 2 b. -2 c. 6 d. -6	1
	C 6	
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 (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.	1

	a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). c. Assertion (A) is true, but Reason (R) is false. d. 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 .	
	A. 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.	Solve the following pair of linear equations. Show your work $x + 2y = 8$ $2x + y = 7$	2
	Graphical Solution of Linear Equations 	
8.	Find any two quadratic equation whose roots are -2 & 3 . How many such equation you can write?	2

	1. Calculate the sum Add the two roots together: $\text{Sum} = (-2) + 3 = 1$ 2. Calculate the product Multiply the two roots together: $\text{Product} = (-2) \times 3 = -6$ 3. Substitute into the formula Plug the sum and product into the general equation: $k(x^2 - (1)x + (-6)) = 0 \implies k(x^2 - x - 6) = 0$ 4. Create two specific examples By assigning different values to the constant k, we generate unique equations: • If $k = 1$: $x^2 - x - 6 = 0$ • If $k = 5$: $5x^2 - 5x - 30 = 0$	
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SECTION – {C}

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

9.	The angry Arjun carried some arrows for fighting with Bheeshm. With half the arrows, he cut down the arrows thrown by Bheeshm on him and with six other arrows he killed the rath driver of Bheeshm. With one arrow each he knocked down respectively the rath, flag and the bow of Bheeshm. Finally, with one more than four times the square root of arrows he laid Bheeshm unconscious on an arrow bed. Find the total number of arrows Arjun had.	3
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	$0.5a + 6 + 1 + 1 + 1 + (1 + 4x - \sqrt{a}) = a$ $4x - \sqrt{a} = 0.5a - 10$ Squaring both the sides, we get $16a = 0.25a^2 + 100 - 10a$ Solving and multiplying both sides by 4, we get $a^2 - 104a + 400 = 0$ $a^2 - 100a - 4a + 400 = 0$ $a(a - 100) - 4(a - 100) = 0$ $(a - 100)(a - 4) = 0$ Hence, $a = 100$ or 4. It can't be 4 as Arjun has thrown more than 4 arrows. Hence no. of arrows = 100	
10.	If -2 is a root of the equation $3x^2 + 7x + p = 0$, find the value of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal.	3
	Given that $x = -2$ is a root of the equation $3x^2 + 7x + p = 0$, substitute $x = -2$ into the equation to find p. Step 2 $3(-2)^2 + 7(-2) + p = 0$ Step 3 Solving this, we get $3(4) - 14 + p = 0 \Rightarrow 12 - 14 + p = 0 \Rightarrow p = 2$ Step 4 Now, consider the equation $x^2 + k(4x + k - 1) + p = 0$. Substitute $p = 2$ into the equation: $x^2 + k(4x + k - 1) + 2 = 0 \Rightarrow x^2 + 4kx + k^2 - k + 2 = 0$ Step 5 For the roots to be equal, the discriminant must be zero: $\Delta = b^2 - 4ac = (4k)^2 - 4(1)(k^2 - k + 2) = 16k^2 - 4(k^2 - k + 2) = 16k^2 - 4k^2 + 4k - 8 = 12k^2 + 4k - 8 = 0$. Solving this quadratic equation for k, we get $3k^2 + k - 2 = 0$. Using the quadratic formula $k = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, we get $k = \frac{-1 \pm \sqrt{1 + 24}}{6} = \frac{-1 \pm 5}{6}$. Thus, $k = \frac{4}{6} = \frac{2}{3}$ or $k = \frac{-6}{6} = -1$.	

	Final Answer: The values of k are $\frac{2}{3}$ and -1.	
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SECTION – {D}

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

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
	To solve the equation, find a common denominator and solve for x: $\frac{(x - 10) + x}{x(x - 10)} = \frac{9}{200}$ $\frac{2x - 10}{x^2 - 10x} = \frac{9}{200}$ $200(2x - 10) = 9(x^2 - 10x)$ $400x - 2000 = 9x^2 - 90x$ $9x^2 - 490x + 2000 = 0$	

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. **4**



Study the following table:

Name of the city	Distance travelled (KM)	Amount paid (in Rs.)
Pune	10	75
	15	110
Delhi	8	91
	14	145

- 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 Delhi)**
- 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 Pune)**
- 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

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:

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

Step 2

Subtract the first equation from the second:

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

$$15y - 10y = 35$$

$$5y = 35$$

$$y = 7$$

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 $y = 7$ ₹

Step 4

Calculate cost for 50 km:

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