



B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL



PERIODIC TEST 2 MATHEMATICS MARKING KEY

Class: XI
Date: 06/11/25
Admission no:

Time: 1hr
Max Marks: 25
Roll no:

General Instructions:

1. This Question Paper has 4 Sections A, B, C and D.
2. Section A has 5 MCQs carrying 1 mark each
3. Section B has 4 questions carrying 02 marks each.
4. Section C has 1 question carrying 03 mark.
5. Section D and E have 1 question carrying 05 and 04 marks respectively.
6. All Questions are compulsory.

SECTION A				
1.	If the 5th term and 8th term of an AP are 20 and 29 respectively, find the 12th term.			
	(a) 41	(b) 38	(c) 35	(d) None of these
2.	The 3rd term of a GP is 24 and the 6th term is 192. Find the common ratio.			
	(a) 2	(b) 3	(c) 4	(d) None of these
3.	The sum of first 10 terms of the GP 2, 6, 18, ... is			
	(a) 39362	(b) 59048	(c) 118090	(d) None of these
4.	The equation $y^2 = 4ax$ represents			
	(a) Parabola	(b) Ellipse	(c) Hyperbola	(d) None of these
5.	The equation of a circle with centre (0, 0) and radius 5 is			
	(a) $x^2 + y^2 = 5$	(b) $x^2 + y^2 = 25$	(c) $x^2 + y^2 + 5 = 0$	(d) None of these
SECTION B				
6.	The 4th term of a G.P. is square of its second term, and the first term is – 3. Determine its 7th term.			
A:-	6. Given GP with first term $a = -3$. Terms: $-3, -3r, -3r^2, -3r^3, \dots$ 4th term = square of 2nd term: $-3r^3 = (-3r)^2 = 9r^2$. For $r \neq 0$: $-3r = 9 \Rightarrow r = -3$. 7th term = $ar^6 = -3(-3)^6 = -3(729) = -2187$. Answer: -2187			

7.	Find the equation of the circle with radius 5 whose centre lies on x-axis and passes through the point (2,3)	2m
A:-	7. Centre on x-axis: $(a, 0)$. Circle: $(x - a)^2 + y^2 = 25$. Substitute $(2, 3)$: $(2 - a)^2 + 9 = 25 \Rightarrow (2 - a)^2 = 16 \Rightarrow 2 - a = \pm 4$. So $a = -2$ or $a = 6$. Equations: $(x + 2)^2 + y^2 = 25$ and $(x - 6)^2 + y^2 = 25$ Answer: those two circles.	1m 1m
8.	Find the centre and the radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$	2m
A:-	8. $x^2 + y^2 + 8x + 10y - 8 = 0$. Complete squares: $(x + 4)^2 - 16 + (y + 5)^2 - 25 - 8 = 0 \Rightarrow (x + 4)^2 + (y + 5)^2 = 49$. Centre $(-4, -5)$, radius 7. Answer: Centre = $(-4, -5)$, Radius = 7.	1m 1m
9.	Insert three numbers between 1 and 256 so that the resulting sequence is a G.P.	2m
A:-	9. Insert three numbers between 1 and 256 to make a GP of 5 terms: Let common ratio r. Then $1 \cdot r^4 = 256 \Rightarrow r^4 = 256 = 4^4 \Rightarrow r = 4$. Inserted numbers: 4, 16, 64. Sequence: 1, 4, 16, 64, 256. Answer: 4, 16, 64	1m 1m
<u>SECTION C</u>		
10.	Show that the ratio of the sum of first n terms of a G.P. to the sum of terms from $(n + 1)^{\text{th}}$ to $(2n)^{\text{th}}$ term is $1/r^n$.	3m
A:-	10. Let GP be $a, ar, \dots$. Sum of first n terms: $S_n = a \frac{1 - r^n}{1 - r}.$ Sum of terms from $(n + 1)^{\text{th}}$ to $2n^{\text{th}}$: $S_{2n} - S_n = a \frac{1 - r^{2n}}{1 - r} - a \frac{1 - r^n}{1 - r} = a \frac{r^n(1 - r^n)}{1 - r}.$ Therefore $\frac{S_n}{S_{n+1 \rightarrow 2n}} = \frac{a \frac{1 - r^n}{1 - r}}{a \frac{r^n(1 - r^n)}{1 - r}} = \frac{1}{r^n}.$	2m 1m
<u>SECTION D</u>		
11.	Find the equation of the circle which passes through the points $(2, -2)$, and $(3, 4)$ and whose centre lies on the line $x + y = 2$.	5m
A:-	11. Centre (h, k) lies on $x + y = 2$ so $h + k = 2$. Circle passes through $(2, -2)$ and $(3, 4)$. Equate squared distances: $(2 - h)^2 + (-2 - k)^2 = (3 - h)^2 + (4 - k)^2$ $\Rightarrow 2h + 12k = 17. \text{ With } h + k = 2 \text{ solve: } k = \frac{13}{10}, h = \frac{7}{10}.$ Radius squared using $(2, -2)$: $r^2 = (2 - \frac{7}{10})^2 + (-2 - \frac{13}{10})^2 = \frac{629}{50}.$ Equation: $(x - \frac{7}{10})^2 + (y - \frac{13}{10})^2 = \frac{629}{50}$	2m 3m
<u>SECTION E</u>		
12.	A bacterial culture doubles every hour. Initially, there are 500 bacteria. Q1. Write the GP representing number of bacteria after each hour.	4m

	Q2. Find the number of bacteria after 6 hours. Q3. Find the total number of bacteria produced in 6 hours.	
A:-	12. Bacterial culture doubles every hour, initial = 500. Q1. GP after each hour (sequence): 500, 1000, 2000, 4000, ... Q2. Number after 6 hours: (using the convention in the paper) $a_6 = 500 \times 2^5 = 16000$. Q3. Total produced in 6 hours (sum of first 6 terms): $S_6 = 500 \frac{2^6 - 1}{2 - 1} = 500(64 - 1) = 500 \times 63 = 31500.$ Answers: (1) 500, 1000, 2000, ... (2) 16000 (3) 31500.	1m 1m 2m
	***** BEST OF LUCK *****	