



# B.K. BIRLA CENTRE FOR EDUCATION

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



## PERIODIC TEST-1, (2026-27) APPLIED MATHEMATICS (241)

**Class: XII**  
**Date: 15/06/26**  
**Admission no:**

**Time: 3hrs**  
**Max Marks: 80**  
**Roll no:**

General Instructions:

Question 1 to 7 carries ONE mark each. Questions 8 to 10 carries TWO marks each.

Questions 11 to 14 carries THREE marks each.

- In which of these intervals is the function  $f(x) = 3x^2 - 4x$  strictly decreasing?  
a)  $(-\infty, 0)$       b)  $(0, 2)$       c)  $(\frac{2}{3}, \infty)$       d)  $(-\infty, \infty)$
- If  $x+y=8$ , then the maximum value of  $xy$  is  
a) 12      b) 16      c) 20      d) 24
- The profit function given by  
a)  $P(x) = R(x)$       b)  $P(x) = C(x) + R(x)$   
c)  $P(x) = R(x) - C(x)$       d)  $P(x) = R(9x) \cdot C(x)$
- $\int \frac{1}{x+x \log x} dx$  is:  
a)  $1 + \log x + c$       b)  $x + \log x + c$       c)  $x \log(1 + \log x) + c$       d)  $\log(1 + \log x) + c$
- $\int_2^3 \frac{x}{x^2+1} dx$  is equal to:  
a)  $\log 4$       b)  $\log \frac{3}{2}$       c)  $\frac{1}{2} \log 2$       d)  $\log \frac{9}{4}$
- If  $\int_0^{40} \frac{dx}{2x+1} = \log k$ , then the value of  $k$  is:  
a)  $\frac{1}{2}$       b) 3      c)  $\frac{9}{2}$       d) 9
- The function  $f(x) = a^x$  is increasing on  $\mathbb{R}$ , if  
a)  $a > 0$       b)  $a < 0$       c)  $0 < a < 1$       d)  $a > 1$
- Determine the interval on which the functions are strictly increasing or strictly decreasing:  $f(x) = -2x^3 + 3x^2 + 12x + 6$ .
- The total cost  $C(x)$  associated with the production of  $x$  units of an item is given by  $C(x) = 0.005x^3 - 0.02x^2 + 30x + 5000$ . Find the marginal cost when 3 units are produced.
- Evaluate:  $\int \frac{dx}{16x^2 - 25}$
- The revenue function of a product is given by the relation  $y = 6000000 - (x - 2000)^2$ , where  $y$  is the total revenue and  $x$  is the number of unit sold. (i) Find what number of units sold maximizes the total revenue.  
(ii) What is the amount of maximum revenue?
- Evaluate:  $\int (7x - 2)\sqrt{3x + 2}$ .
- Evaluate the following Integral:  $\int x \log(1 + x) dx$ .
- Find the value of:  $\int_0^1 \frac{e^{-x}}{1 + e^x} dx$ .

\*\*\*\*\*ALL THE BEST\*\*\*\*\*