Class 12 Practice Paper 1, 2026
Topic: Calculus (Chapter 5 to 9)
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Maximum Marks: 40 Duration: 90 mins

Section-A

Questions 1 to 7 carry 1 mark each

1. Evaluate $\int e^x \left(\frac{2+\sin 2x}{1+\cos 2x}\right) dx$
   (A) $e^x \tan x + C$ (B) $e^x \cot x + C$
   (C) $e^x (\mathrm{x} + \tan x) + C$ (D) $e^x (\mathrm{x} + \cot x) + C$
2. Find the interval in which $f(x) = x^2 - 4x + 5$ is increasing
   (A) (2, ∞) (B) (-∞, 2)
   (C) (3, ∞) (D) (-∞, ∞)
3. If $x = a(\cos t + t \sin t)$ and $y = a(\sin t - t \cos t)$ then the value of $\frac{d^2y}{dx^2}$ is
   (A) $\frac{t}{a}\sec^3 t$ (B) $at \sec^3 t$
   (C) $\frac{1}{at}\sec^3 t$ (D) $\frac{a}{t}\sec^3 t$
4. What is the position of the particle moving along the parabola $y^2 = 4x$ at which the rate at of increase of the abscissa is twice the rate of increase of the ordinate?
   (A) (1, 1) (B) (2, 2)
   (C) (3, 3) (D) (4, 4)
5. Find the sum of the order and degree of the differential equation $(y''')^2 + 7y' - (\cos x)^2 = 0$
   (A) 5 (B) 2
   (C) 3 (D) Not Defined
6. Integrating factor of the differential equation $(1 - x^2)\frac{dy}{dx} - xy = 1$ is..
   (A) $-x$ (B) $\frac{x}{1+x^2}$
   (C) $\sqrt{1 - x^2}$ (D) $\frac{1}{2}\log(1 - x^2)$
7. The rate of change of the volume of a sphere with respect to its surface area, when its radius is
   (A) 1 unit (B) 2 units
   (C) 3 units (D) None of these

Section B

Questions 8 to 12 carry 2 marks each

8. Determine the value of k for which the following function is continuous at x=3:

$$f(x) = \begin{cases} \frac{(x+3)^2 - 36}{x-3}, & x \neq 3 \\ k, & x = 3 \end{cases}$$

9. Differentiate $\tan^{-1}\left(\frac{1+\cos x}{\sin x}\right)$ with respect to x.

Solution to the test
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10. Evaluate $\int \frac{dx}{\sin^2 x.\cos^2 x}$
11. Using integration, find the area bounded by the curve $x^2 = 4y$, x = 2 and the X axis in the First Quadrant.
12. Find the general solution of the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$.

Section C

Questions 13 to 15 carry 3 marks each

13. If $y = (x + \sqrt{1 + x^2})^n$, then show that $(1 + x^2)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = n^2y$
14. Show that the function $f(x) = |x + 1| + |x - 1|$, for all $x \in \boldsymbol{R}$ is not differentiable at the points x = -1 and x = 1.
15. Using integration, find the area of the region bounded by the curves y = |x + 1| + 1, x = – 3, x = 3 and y = 0.

Section D

Questions 16 to 17 carry 5 marks each

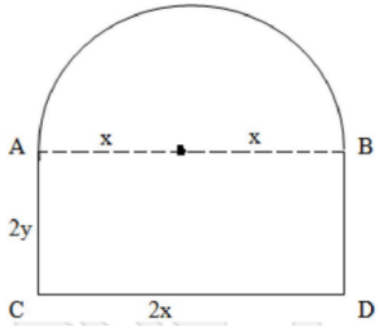
16. Evaluate $\int (x + 3)\sqrt{(3 - 4x - x^2)}\ dx$
17. Solve the following differential equation given that y=0 when x=1

$$xdy - ydx = \sqrt{x^2 + y^2}$$

Section E

Questions 18 carries 4 marks (1+1+2)

18. Dr. Anuradha residing in Chandigarh went to see an apartment of 3 BHK sector 31. The window of the house was in the form of a rectangle surmounted by a semicircular opening having a perimeter of the window 10 m in as shown in the figure below:



Based on the above information answer the following:

(i) Find the relation between x and y

(ii) Express the area 'A' of the window as a function of x

(iii) (A) For what value of x will the window have maximum area?

OR

(iii) (B) For what value of y will the window have maximum area?

Solution to the test

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