MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 35

Total Marks : 28

Max. Time : 32 min.

Topics : Complex Number, Continuity & Derivability, Application of Derivatives, Sequence & Series

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1,2,3,4	(3 marks, 3 min.)	[12, 12]
Subjective Questions (no negative marking) Q,5,6,7,8	(4 marks, 5 min.)	[16, 20]

1. The angle at which the curve $y = 2e^{2x}$ intersects the y-axis is

(A) $\tan^{-1} 4$ (B) $\cot^{-1} 4$ (C) $\tan^{-1} 2$ (D) $\cot^{-1} 2$

2. The subnormal at any point on the curve $xy^n = a^{n+1}$ is constant for:

(A) n = 0 (B) n = 1 (C) n = – 2 (D) no value of n

3. Let the sequence $a_1, a_2, a_3, \ldots\ldots\ldots a_{2n-1}, a_{2n}$ form an A.P. Then the value of,

$$a_1^2 - a_2^2 + a_3^2 - \ldots\ldots\ldots + a_{2n-1}^2 - a_{2n}^2 \text{ is :}$$

(A) $\dfrac{2n}{n-1}\left(a_{2n}^2 - a_1^2\right)$ (B) $\dfrac{n}{2n-1}\left(a_1^2 - a_{2n}^2\right)$

(C) $\dfrac{n}{n+1}\left(a_1^2 + a_{2n}^2\right)$ (D) $\dfrac{n}{n-1}\left(a_1^2 + a_{2n}^2\right)$

4. Let f(x) = max. $\left\{|x^2 - 2|x||, |x|\right\}$ and g(x) = min. $\left\{|x^2 - 2|x||, |x|\right\}$, then

(A) both f(x) and g(x) are non differentiable at 5 points.

(B) f(x) is not differentiable at 5 points and g(x) is non differentiable at 7 points.

(C) number of points of non differentibility for f(x) and g(x) are 7 and 5 respectively.

(D) both f(x) and g(x) are non differentiable at 3 and 5 points respectively.

5. If $f(x) = \dfrac{2}{\sqrt{3}}\tan^{-1}\left(\dfrac{2x+1}{\sqrt{3}}\right) - \ell n\,(x^2 + x + 1) + (k^2 - 5k + 3)\,x + 10$ is a decreasing function for all $x \in R$,

find the permissible values of k.

6. Using monotonicity find range of the function $f(x) = \sqrt{x-1} + \sqrt{6-x}$.

7. The centre of a square is at the point with complex number $z_0 = 1 + i$ and one of its vertices is at the points $z_1 = 1 - i$. The complex numbers which correspond to the other vertices are _____, _____ & _____.

8. Find the length of arc given by $\text{Arg}\left(\dfrac{z-1}{z+2i}\right) = \pi/3$

Answers Key

1. (B) **2.** (C) **3.** (B) **4.** (B)

5. $k \in \left[\frac{5-\sqrt{5}}{2}, \frac{5+\sqrt{5}}{2}\right]$ **6.** $\left[\sqrt{5}, \sqrt{10}\right]$

7. $-1+i, 1+3i, 3+i$ **8.** $\frac{\sqrt{5}}{\sqrt{3}} . \frac{4\pi}{3}$