DPP

DAILY PRACTICE PROBLEMS

Class : XIth **Subject : Maths**

Date : **DPP No. :4**

Topic :-Application of Derivatives

1. The set $\{x^3 - 12x : -3 \le x \le 3\}$ is equal to

   a) $\{x: -16 \le x \le 16\}$ b) $\{x: -12 \le x \le 12\}$ c) $\{x: -9 \le x \le 9\}$ d) $\{x: 0 \le x \le 10\}$

2. If $xy = a^2$ and $S = b^2x + c^2y$ where a, b and c are constants, then the minimum value of S is

   a) abc b) $\sqrt{a}\, bc$ c) $2abc$ d) None of these

3. Let $g(x) = f(x) + f'(1-x)$ and $f''(x) < 0, 0 \le x \le 1$. Then

   a) $g(x)$ increases on $[1/2,1]$ and decreases on $[0,1/2]$
   b) $g(x)$ decreases on $[0,1]$
   c) $g(x)$ increases on $[0,1]$
   d) $g(x)$ increases on $[0,1/2]$ and decreases on $[1/2,1]$

4. Select the correct statement from (a), (b), (c), (d) The function $f(x) = xe^{1-x}$

   a) Strictly increasing in the interval $\left(\frac{1}{2}, 2\right)$ b) Increasing in the interval $(0, \infty)$
   c) Decreases in the interval $(0, 2)$ d) Strictly decreasing in the interval $(1, \infty)$

5. If $\frac{a_0}{n+1} + \frac{a_1}{n} + \frac{a_2}{n-1} + \ldots + \frac{a_{n-1}}{2} + a_n = 0$. Then the function $f(x) = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \ldots + a_n$ has in $(0, 1)$

   a) At least one zero b) At most one zero c) Only 3 zeros d) Only 2 zeros

6. A particle is moving along the curve $x = at^2 + bt + c$. If $ac = h^2$, then the particle would be moving with uniform

   a) Rotation b) Velocity c) Acceleration d) Retardation

7. The approximate value of $(33)^{1/5}$ is

a) 2.0125 b) 2.1 c) 2.01 d) None of these

8. At an instant the diagonal of a square is increasing at the rate of 0.2cm/sec and the area is increasing at the rate of 6cm^2/sec. At that moment its side is

a) $\frac{30}{\sqrt{2}}$ cm b) $30\sqrt{2}$ cm c) 30 cm d) 15 cm

9. A missile is fired from the ground level rises x metres vertically upwards in t seconds where $x = 100t - \frac{25}{2}t^2$.The maximum height reached is

a) 200 m b) 125 m c) 160 m d) 190 m

10. The intercepts made by the tangent to the curve $y = \int_0^x |t|dt$, which is parallel to the line $y = 2x$, on y-axis are equal to

a) $1, -1$ b) $-2, 2$ c) 3 d) -3

11. The function $f(x) = \tan x - x$

a) Always increases
b) Always decreases
c) Never decreases
d) Some times increases and some times decreases

12. The maximum value of xy subject to $x + y = 8$, is

a) 8 b) 16 c) 20 d) 24

13. The tangent to the curve $y = 2x^2 - x + 1$ is parallel to the line $y = 3x + 9$ at the point

a) (3, 9) b) (2, -1) c) (2, 1) d) (1, 2)

14. The point P of the curve $y^2 = 2x^3$ such that the tangent at P is perpendicular to the line $4x - 3y + 2 = 0$ is given by

a) (2, 4) b) $(1, \sqrt{2})$ c) $(1/2, -1/2)$ d) $(1/8, -1/16)$

15. If the parametric equation of a curve given by $x = e^t \cos t$, $y = e^t \sin t$, then the tangent to the curve at the point $t = \pi/4$ makes with axis of x the angle

a) 0 b) $\pi/4$ c) $\pi/3$ d) $\pi/2$

16. All points on the curve $y^2 = 4a\left(x + a \sin\frac{x}{a}\right)$ at which the tangents are parallel to the axis of x lie on a

a) Circle b) Parabola c) Line d) None of these

17. The point of inflexion for the curve $y = x^{5/2}$ is

a) (1, 1) b) (0, 0) c) (1, 0) d) (0, 1)

18. The minimum value of $2x + 3y$, when $xy = 6$, is

a) 12 b) 9 c) 8 d) 6

19. If $(x) = x^2 - 2x + 4$ on $[1, 5]$, then the value of a constant c such that $\frac{f(5) - f(1)}{5 - 1} = f'(c)$, is

a) 0 b) 1 c) 2 d) 3

20. Let a,b be two distinct roots of a polynomial $f(x)$. Then there exists at least one root lying between a and b of the polynomial

a) $f(x)$ b) $f'(x)$ c) $f''(x)$ d) None of these