DPP
DAILY PRACTICE PROBLEMS

Class : XIth | **Subject : Maths**
Date : | **DPP No. :6**

Topic :-Application of Derivatives

1. If tangent to the curve $x = at^2, y = 2at$ is perpendicular to x-axis, then its point of contact is

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

2. If $y = 4x - 5$ is tangent to the curve $y^2 = px^3 + q$ at (2, 3) then (p,q) is

   a) (2, 7) b) $(-2, 7)$ c) $(-2, -7)$ d) $(2, -7)$

3. A particle is moving in a straight line. At time t, the distance between the particle from its starting point is given by $x = t - 6t^2 + t^3$.Its acceleration will be zero at

   a) $t = 1$ unit time b) $t = 2$ units time c) $t = 3$ units time d) $t = 4$ units time

4. If $y = 4x - 5$ is a tangent to the curve $y^2 = px^3 + q$ at (2, 3), then

   a) $p = 2, q = -7$ b) $p = -2, q = 7$ c) $p = -2, q = -7$ d) $p = 2, q = 7$

5. Let the function $g:(-\infty, \infty) \to \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ be given by $g(u) = 2\tan^{-1}(e^u) - \frac{\pi}{2}$. Then, g is

   a) Even and is strictly increasing in $(0, \infty)$
   b) Odd and is strictly decreasing in $(-\infty, \infty)$
   c) Odd and is strictly increasing in $(-\infty, \infty)$
   d) Neither even nor odd, but is strictly increasing in $(-\infty, \infty)$

6. The tangent to the curve $y = 2x^2 - x + 1$ at a point P is parallel to $y = 3x + 4$, then the coordinates of $P$are

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

7. Let a, b, c be positive real numbers and $ax^2 + b/x^2 \geq 2$ for all $x \in R^+$. Then,

   a) $4ab \geq c^2$ b) $4ac \geq b^2$ c) $4bc \geq a^2$ d) $4ac < b^2$

8. The function $f(x) = x^4 - 62x^2 + ax + 9$ attains its maximum value on the interval [0, 2] at $x = 1$. Then, the value of a is

a) 120 b) -120 c) 52 d) 60

9. The point on the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$, the normal at which is parallel to the x-axis, is

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

10. The equation of the tangent to curve $y(2x-1)e^{2(1-x)}$ at the points its maximum, is

a) $y - 1 = 0$ b) $x - 1 = 0$ c) $x + y - 1 = 0$ d) $x - y + 1 = 0$

11. If for a function $f(x)$, $f'(a) = 0$, $f''(a) = 0$, $f'''(a) > 0$, then at $x = a$, $f(x)$ is

a) Minimum b) Maximum c) Not an extreme point d) Extreme point

12. The function $f(x) = x + \sin x$ has

a) A minimum but no maximum b) A maximum but no minimum
c) Neither maximum nor minimum d) Both maximum and minimum

13. Gas is being pumped into a spherical balloon at the rate of $30 ft^3$/min.Then, the rate at which the radius increases when it reaches the value 15ft is

a) $\frac{1}{15\pi}$ft/min b) $\frac{1}{30\pi}$ft/min c) $\frac{1}{20}$ft/min d) $\frac{1}{25}$ft/min

14. The equation of tangent to the curve $\frac{x^2}{3} - \frac{y^2}{2} = 1$, which is parallel to $y = x$, is

a) $y = x \pm 1$ b) $y = x - 1/2$ c) $y = x + 1/2$ d) $y = 1 - x$

15. If the curves $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and $\frac{x^2}{l^2} - \frac{y^2}{m^2} = 1$ cut each other orthogonally, then

a) $a^2 + b^2 = l^2 + m^2$ b) $a^2 - b^2 = l^2 - m^2$ c) $a^2 - b^2 = l^2 + m^2$ d) $a^2 + b^2 = l^2 - m^2$

16. A point moves along the curve $12y = x^3$ in such a way that the rate of increase of its ordinate is more than the rate of increase of abscissa. The abscissa of the point lies in the interval

a) $(-2, 2)$ b) $(-\infty, -2) \cup (2, \infty)$ c) $[-2, 2]$ d) None of these

17. The smallest circle with centre on y-axis and passing through the point(7,3)has radius

a) $\sqrt{58}$ b) 7 c) 3 d) 4

18. The point in the interval $[0, 2\pi]$, where $f(x) = e^x \sin x$ has maximum slope, is

a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) π d) $\frac{3\pi}{2}$

19. The perimeter of a sector is p. The area of the sector is maximum, when its radius is

a) $\sqrt{p}$ b) $\frac{1}{\sqrt{p}}$ c) $\frac{p}{2}$ d) $\frac{p}{4}$

20. The normal at point (1,1) of the curve $y^2 = x^3$ is parallel to the line

a) $3x - y - 2 = 0$ b) $2x + 3y - 7 = 0$ c) $2x - 3y + 1 = 0$ d) $2y - 3x + 1 = 0$