DPP
DAILY PRACTICE PROBLEMS

Class : XIth | **Subject : Maths**
Date : | **DPP No. :7**

Topic :-Application of Derivatives

1. A particle moves in a straight line so that $s=\sqrt{t}$, then its acceleration is proportional to
a) $(\text{velocity})^3$ b) velocity c) $(\text{velocity})^2$ d) $(\text{velocity})^{3/2}$

2. If PQ and PR are the two sides of a triangle, then the angle between them which gives maximum area of the triangle, is
a) π b) $\pi/3$ c) $\pi/4$ d) $\pi/2$

3. The function $f(x)=a\cos x+b\tan x+x$ has extreme values at $x=0$ and $x=\frac{\pi}{6}$, then
a) $a=-\frac{2}{3}, b=-1$ b) $a=\frac{2}{3}, b=-1$ c) $a=-\frac{2}{3}, b=1$ d) $a=\frac{2}{3}, b=1$

4. The distance between the origin and the normal to the curve $y=e^{2x}+x^2$ at $x=0$ is
a) 2 b) $\frac{2}{\sqrt{3}}$ c) $\frac{2}{\sqrt{5}}$ d) $\frac{1}{2}$

5. The function $f(x)=x\,e^{1-x}$ strictly
a) Increases in the interval $(0,\infty)$
b) Decreases in the interval $(0,2)$
c) Increases in the interval $(1/2, 2)$
d) Decreases in the interval $(1,\infty)$

6. If f and g are two decreasing functions such that gof exists, then gof, is
a) An increasing function
b) A decreasing function
c) Neither increasing nor decreasing
d) None of these

7. The length of subnormal of parabola $y^2=4ax$ at any point is equal to
a) $\sqrt{2}a$ b) $2\sqrt{2}a$ c) $\frac{a}{\sqrt{2}}$ d) $2a$

8. If tangent to the curve $x=at^2, y=2at$ is perpandicular to x-axis, then its point of contact is
a) (a,a) b) $(0,a)$ c) $(0,0)$ d) $(a,0)$

9. The abscissa of the point on the curve $ay^2 = x^3$, the normal at which cuts off equal intercepts from the coordinate axes is

a) $2\,a/9$ b) $4\,a/9$ c) $-4\,a/9$ d) $-2\,a/9$

10. The point on the curve $y = 2x^2 - 6x - 4$ at which the tangent is parallel to the x-axis, is

a) $\left(\frac{3}{2}, \frac{13}{2}\right)$ b) $\left(-\frac{5}{2}, -\frac{17}{2}\right)$ c) $\left(\frac{3}{2}, \frac{17}{2}\right)$ d) $\left(\frac{3}{2}, -\frac{17}{2}\right)$

11. If the function $f(x) = x^3 - 6x^2 + ax + b$ satisfies Rolle's theorem in the interval $[1, 3]$ and $f'\left(\frac{2\sqrt{3}+1}{\sqrt{3}}\right) = 0$, then

a) $a = -11$ b) $a = -6$ c) $a = 6$ d) $a = 11$

12. Let $g(x) = \begin{cases} 2e & if\ x \le 1 \\ \log(x-1), & if\ x > 1 \end{cases}$. The equation of the normal to y=$g(x)$at the point (3,log 2), is

a) $y - 2x = 6 + \log 2$ b) $y + 2x = 6 + \log 2$ c) $y + 2x = 6 - \log 2$ d) $y + 2x = -6 + \log 2$

13. If f is an increasing function and g is a decreasing function on an interval I such that fog exists, then

a) fog is an increasing function on I
b) fog is a decreasing function on I
c) fog is neither increasing nor decreasing on I
d) None of these

14. N characters of information are held on magnetic tape, in batches of x characters each, the batch processing time is $\alpha + \beta x^2$ seconds, α and β are constants. The optical value of x for fast processing is,

a) α/β b) β/α c) $\sqrt{\alpha/\beta}$ d) $\sqrt{\beta/\alpha}$

15. The longest distance of the point $(a, 0)$ from the curve $2x^2 + y^2 - 2\,x = 0$, is given by

a) $\sqrt{1 - 2\,a + a^2}$ b) $\sqrt{1 + 2\,a + 2a^2}$ c) $\sqrt{1 + 2\,a - a^2}$ d) $\sqrt{1 - 2\,a + 2\,a^2}$

16. The coordinates of the point on the curve $y = x^2 - 3x + 2$ where the tangent is perpendicular to the straight line $y = x\ are$

a) (0.2) b) (1.0) c) $(-1,6)$ d) $(2, -2)$

17. The tangent and normal at the point $P(at^2, 2\,at)$ to the parabola $y^2 = 4\,ax$ meet the x-axis in T and G respectively, then the angle at which the tangent at P to the parabola is inclined to the tangent at P to the circle through T, P, G is

a) $\tan^{-1} t^2$ b) $\cot^{-1} t^2$ c) $\tan^{-1} t$ d) $\cot^{-1} t$

18. The normal to the curve $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ at any point θ is such that

a) It is at a constant distance from the origin
b) It passes through $\left(\frac{a\pi}{2}, -a\right)$
c) It makes angle $\frac{\pi}{2} - \theta$ with the x-axis
d) It passes through the origin

19. If $f(x) = xe^{x(1-x)}$, then $f(x)$ is

a) Increasing on $\left[-\frac{1}{2}, 1\right]$
b) Decreasing on R
c) Increasing on R
d) Decreasing on $\left[-\frac{1}{2}, 1\right]$

20. The function $f(x) = 2x^3 - 15x^2 + 36x + 4$ is maximum at

a) $x = 2$
b) $x = 4$
c) $x = 0$
d) $x = 3$