DPP
DAILY PRACTICE PROBLEMS

Class : XIth **Subject : Maths**
Date : **DPP No. :9**

Topic :-Application of Derivatives

1. If the ratio of base radius and height of a cone is 1 :2 and percentage error in radius is λ %, then the error in its volume is
a) λ % b) 2λ % c) $3\ \lambda$% d) None of these

2. The values of a in order that $f(x) = \sqrt{3}\sin x - \cos x - 2ax + b$ decreases for all real values of x, is given by
a) $a < 1$ b) $a \geq 1$ c) $a \leq \sqrt{2}$ d) $a < \sqrt{2}$

3. The function $f(x) = \cos(\pi/x)$ is increasing in the interval
a) $(2n + 1, 2\ n), n \in N$
b) $\left(\frac{1}{2\ n + 1}, 2\ n\right), n \in N$
c) $\left(\frac{1}{2\ n + 2}, \frac{1}{2\ n + 1}\right), n \in N$
d) None of these

4. If the curves $\frac{x^2}{a^2} + \frac{y^2}{12} = 1$ and $y^3 = 8x$ intersect at right angle then the value of $a^2$is equal to
a) 16 b) 12 c) 8 d) 4

5. Let $f(x)$ and $g(x)$ be differentiable for $0 \leq x \leq 1$, such that $f(0) = 2, g(0) = 0, f(1) = 6$. Let there exist a real number c in [0, 1] such that $f'(c) = 2g'(c)$, then the value of $g(1)$ must be
a) 1 b) 2 c) -2 d) -1

6. If a differentiable function $f(x)$ has a relative minimum at $x = 0$, then the function $\phi(x) = f(x) + ax + b$ has a relative minimum at $x = 0$ for
a) All a and all b b) All b if $a = 0$ c) All $b > 0$ d) All $a > 0$

7. The point at which the tangent to the curve $y = 2x^2 - x + 1$ is parallel to $y = 3x + 9$, will be
a) (2, 1) b) (1, 2) c) (3, 9) d) $(-2, 1)$

8. The maximum slope of the curve $y = -x^3 + 3x^2 + 2x - 27$ is
a) 5 b) -5 c) 1/5 d) None of these

9. For the curve $y^n = a^{n-1}x$ if the subnormal at any point is a constant, then n is equal to
a) 1 b) 2 c) -2 d) -1

10. On which of the following intervals is the function $f(x) = 2x^2 - \log|x|, x \neq 0$ increasing?
a) $(1/2,\infty)$
b) $(-\infty,-1/2) \cup (1/2,\infty)$
c) $(-\infty,-1/2) \cup (0,1/2)$
d) $(-1/2, 0) \cup (1/2,\infty)$

11. 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) $\frac{2a}{9}$ b) $\frac{4a}{9}$ c) $-\frac{4a}{9}$ d) $-\frac{2a}{9}$

12. If $f(x) = \sin x - \cos x$, the interval in which function is decreasing in $0 \leq x \leq 2\pi$, is
a) $\left[\frac{5\pi}{6}, \frac{3\pi}{4}\right]$ b) $\left[\frac{\pi}{4}, \frac{\pi}{2}\right]$ c) $\left[\frac{3\pi}{2}, \frac{5\pi}{2}\right]$ d) None of these

13. The function $f(x) = \frac{x}{2} + \frac{2}{x}$ has local minimum at
a) $x = -2$ b) $x = 0$ c) $x = 1$ d) $x = 2$

14. The least value of the $f(x)$ given by $f(x) = \tan^{-1} x - \frac{1}{2}\log_e x$ in the interval $[1/\sqrt{3}, \sqrt{3}]$, is
a) $\frac{\pi}{6} + \frac{1}{4}\log_e 3$ b) $\frac{\pi}{3} - \frac{1}{4}\log_e 3$ c) $\frac{\pi}{6} - \frac{1}{4}\log_e 3$ d) $\frac{\pi}{3} + \frac{1}{4}\log_e 3$

15. If the line $ax + by + c = 0$ is a normal to the curve $xy = 1$, then
a) $a > 0, b > 0$ b) $a > 0, b < 0$ c) $a < 0, b < 0$ d) Data is insufficient

16. Let y be the number of people in a village at time t. Assume that the rate of change of the population is proportional to the number of people in the village at any time and further assume that the population never increase in time. Then, the population of the village at any fixed t is given by
a) $y = e^{kt} + c$, for some constants $c \leq 0$ and $k \geq 0$
b) $y = ce^{kt}$, for some constants $c \geq 0$ and $k \leq 0$
c) $y = e^{ct} + k$, for some constants $c \leq 0$ and $k \geq 0$
d) $y = k\,e^{ct}$, for some constants $c \geq 0$ and $k \leq 0$

17. The equation of the tangent to the curve $x^2 - 2xy + y^2 + 2x + y - 6 = 0$ at (2,2) is
a) $2x + y - 6 = 0$ b) $2y + x - 6 = 0$ c) $x + 3y - 8 = 0$ d) $3x + y - 8 = 0$

18. The length of the normal to the curve $x = a(\theta + \sin\theta), y = a(1 - \cos\theta)$ at $\theta = \frac{\pi}{2}$ is
a) 2a b) $\frac{a}{2}$ c) $\frac{a}{\sqrt{2}}$ d) $\sqrt{2a}$

19. The maximum value of function $f(x) = \sin x(1 + \cos x), x \in R$ is

a) $\frac{3^{3/2}}{4}$ b) $\frac{3^{5/3}}{4}$ c) $\frac{3}{2}$ d) $\frac{3^{7/5}}{4}$

20. The minimum value of $2x^2 + x - 1$ is

a) $-\frac{1}{4}$ b) $\frac{3}{2}$ c) $-\frac{9}{8}$ d) $\frac{9}{8}$