DPP

DAILY PRACTICE PROBLEMS

**Class : XIth** **Subject : Maths**
**Date :** **DPP No. :10**

# Topic :-Application of Derivatives

1. If $x = t^2$ and $y = 2t$, then equation of the normal at $t = 1$, is
   a) $x + y - 3 = 0$ b) $x + y - 1 = 0$ c) $x + y + 1 = 0$ d) $x + y + 3 = 0$

2. The side of an equilateral triangle is $'a'$ units and is increasing at the rate of $\lambda$ units/sec. The rate of increase of its area is
   a) $\frac{2}{\sqrt{3}}\lambda\, a$ b) $\sqrt{3}\lambda\, a$ c) $\frac{\sqrt{3}}{2}\lambda\, a$ d) None of these

3. If a and b are positive numbers such that $a > b$, then the minimum value of a sec $\theta - b\tan\theta$ $\left(0 < \theta < \frac{\pi}{2}\right)$ is
   a) $\frac{1}{\sqrt{a^2 - b^2}}$ b) $\frac{1}{\sqrt{a^2 + b^2}}$ c) $\sqrt{a^2 + b^2}$ d) $\sqrt{a^2 - b^2}$

4. If $y = x^n$, then the ratio of relative errors in $y$ and $x$ is
   a) 1 :1 b) 2 :1 c) 1 :$n$ d) $n$ :1

5. How many real solutions does the equation $x^7 + 14x^5 + 16x^3 + 30x - 560 = 0$ have?
   a) 5 b) 7 c) 1 d) 3

6. The function $f(x) = x^3 + ax^2 + bx + c, a^2 \leq 3b$ has
   a) One maximum value b) One minimum value
   c) No extreme value d) One maximum and one minimum value

7. The fixed point $P$ on the curve $y = x^2 - 4x + 5$ such that the tangent at $P$ is perpendicular to the line $x + 2y - 7 = 0$ is given by
   a) (3, 2) b) (1, 2) c) (2, 1) d) None of these

8. If the area of the triangle, included between the axes and any tangent to the curve $xy^n = a^{n+1}$ is constant, then the value of $n$ is
   a) $-1$ b) $-2$ c) 1 d) 2

9. The radius of a circular plate is increasing at the rate of 0.01 cm/s when the radius is 12 cm. Then , The rate at which the area increase, is
a) $0.24\ \pi$ sq cm/s b) $60\ \pi$ sq cm/s c) $24\ \pi$ sq cm/s d) $1.2\ \pi$ sq cm/s

10. If $g(x) = \min(x, x^2)$ where $x$ is real number, then
a) $g(x)$ is an increasing function
b) $g(x)$ is a decreasing function
c) $g(x)$is a constant function
d) $g(x)$ is a continuous function except at $x = 0$

11. The angle between the curves $y = a^x$ and $y = b^x$ is equal to
a) $\tan^{-1}\left(\left|\frac{a-b}{1+ab}\right|\right)$ b) $\tan^{-1}\left(\left|\frac{a+b}{1-ab}\right|\right)$
c) $\tan^{-1}\left(\left|\frac{\log b + \log a}{1 + \log a \log b}\right|\right)$ d) $\tan^{-1}\left(\left|\frac{\log a - \log b}{1 + \log a \log b}\right|\right)$

12. The function which is neither decreasing nor increasing in $\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$, is
a) cosec $x$ b) $\tan x$ c) $x^2$ d) $|x-1|$

13. On the interval $[0, 1]$ the function $x^{25}(1-x)^{75}$ takes its maximum value at the point
a) 0 b) $\frac{1}{4}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$

14. A function $f$ is defined by $f(x) = e^x \sin x$ in$[0, \pi]$. Which of the following is not correct?
a) $f$ is continous in $[0, \pi]$ b) $f$ is differentiable in $[0, \pi]$
c) $f(0) = f(\pi)$ d) Rolle's theorem is not true in $[0, \pi]$

15. If $xy = c^2$, then minimum value of $ax + by$ is
a) $c\sqrt{ab}$ b) $2c\sqrt{ab}$ c) $-c\sqrt{ab}$ d) $-2c\sqrt{ab}$

16. If $x - 2y = 4$, the minimum value of $xy$ is
a) -2 b) 0 c) 0 d) -3

17. The function $f(x) = (9 - x^2)^2$ increasing in
a) $(-3, 0) \cup (3, \infty)$ b) $(-\infty, -3) \cup (3, \infty)$ c) $(-\infty, -3) \cup (0, 3)$ d) $(-3, 3)$

18. The real number $x$ when added to its inverse gives the minimum value of the sum at $x$ equals to
a) 2 b) 1 c) -1 d) -2

19. The points on the curve $12y = x^3$ whose ordinate and abscissa change at the same rate, are
a) $(-2, -2/3)$,$(2, 2/3)$b) $(-2/3, -2)$, $(2/3, 2)$c) $(-2, -2/3)$ only d) $(2/3, 2)$ only

20. Let $P(2, 2)$ and $Q(1/2, -1)$ be two points on the parabola $y^2 = 2x$. The coordinates of the point $R$ on the parabola $y^2 = 2x$, where the tangent to the curve is parallel to the chord $PQ$, are

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