

MATHEMATICS (ASSIGNMENT-3)

TOPIC- DIFFERENTIATION

- If $y = x - x^2$, then the derivatives of y^2 w. r. t. x^2 is
 a) $2x^2 + 3x - 1$ b) $2x^2 - 3x + 1$ c) $2x^2 + 3x + 1$ d) $2x^2 - 3x - 1$
- $\frac{d^2}{dx^2}(2 \cos x \cos 3x)$ is equal to
 a) $2^2(\cos 2x + 2^2 \cos 4x)$ b) $2^2(\cos 2x - 2^2 \cos 4x)$
 c) $2^2(-\cos 2x + 2^2 \cos 4x)$ d) $-2^2(\cos 2x + 2^2 \cos 4x)$
- If $z = \log(\tan x + \tan y)$, then $(\sin 2x) \frac{\partial}{\partial x} + (\sin 2y) \frac{\partial}{\partial y}$ is equal to
 a) 1 b) 2 c) 3 d) 4
- If $y = a \sin^3 \theta$ and $x = a \cos^3 \theta$, then at $\theta = \frac{\pi}{3}$, $\frac{dy}{dx}$ is equal to
 a) $\frac{1}{\sqrt{3}}$ b) $-\sqrt{3}$ c) $-\frac{1}{\sqrt{3}}$ d) $\sqrt{3}$
- Derivative of the function $f(x) = \log_5(\log_7 x)$, $x > 7$ is
 a) $\frac{1}{x(\log 5)(\log 7)(\log_7 x)}$ b) $\frac{1}{x(\log 5)(\log 7)}$
 c) $\frac{1}{x(\log x)}$ d) None of these
- If $u = x^2 + y^2$ and $x = s + 3t$, $y = 2s - t$, then $\frac{d^2u}{ds^2}$ is equal to
 a) 12 b) 32 c) 36 d) 10
- If $y = 2^{\log x}$, then $\frac{dy}{dx}$ is
 a) $\frac{2^{\log x}}{\log 2}$ b) $2^{\log x} \cdot \log 2$ c) $\frac{2^{\log x}}{x}$ d) $\frac{2^{\log x} \cdot \log 2}{x}$
- If $y = e^{\sin^{-1} x}$ and $u = \log x$, then $\frac{dy}{du}$ is
 a) $\frac{e^{\sin^{-1} x}}{\sqrt{1-x^2}}$ b) $x e^{\sin^{-1} x}$ c) $\frac{x e^{\sin^{-1} x}}{\sqrt{1-x^2}}$ d) $\frac{e^{\sin^{-1} x}}{x}$
- If $f(x) = \cos x \cos 2x \cos 4x \cos 8x \cos 16x$, then $f'(\frac{\pi}{4})$ is
 a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) 0 d) $\frac{\sqrt{3}}{2}$
- If $x = a(\cos \theta + \theta \sin \theta)$ and $y = a(\sin \theta - \theta \cos \theta)$, then $\frac{dy}{dx}$ is equal to
 a) $\cos \theta$ b) $\tan \theta$ c) $\sec \theta$ d) $\operatorname{cosec} \theta$

11. If $y = x \log \left(\frac{x}{a+bx} \right)$, then $\frac{x^3 d^2 y}{dx^2}$ is equal to
 a) $x \frac{dy}{dx} - y$ b) $\left(x \frac{dy}{dx} - y \right)^2$ c) $y \frac{dy}{dx} - x$ d) None of these
12. If $y = \sin^{-1} \frac{x}{2} + \cos^{-1} \frac{x}{2}$, then the value of $\frac{dy}{dx}$ is
 a) 1 b) -1 c) 0 d) 2
13. If $x = a \cos \theta, y = b \sin \theta$, then $\frac{d^3 y}{dx^3}$ is equal to
 a) $-\frac{3b}{a^3} \operatorname{cosec}^4 \theta \cot^4 \theta$ b) $\frac{3b}{a^3} \operatorname{cosec}^4 \theta \cot^4 \theta$ c) $-\frac{3b}{a^3} \operatorname{cosec}^4 \theta \cot \theta$ d) None of these
14. If $y^2 = ax^2 + bx + c$ where a, b, c are constants, then $y^3 \frac{d^2 y}{dx^2}$ is equal to
 a) A constant b) A function of x c) A function of y d) A function of x and y both
15. Let $y = t^{10} + 1$ and $x = t^8 + 1$, then $\frac{d^2 y}{dx^2}$ is equal to
 a) $\frac{5}{2} t$ b) $20 t^8$ c) $\frac{5}{16 t^6}$ d) None of these
16. If $f(x) = x + 2$, then the value of $f'[f(x)]$ at $x = 4$ is
 a) 8 b) 1 c) 4 d) 5
17. The derivative of $f(x) = 3|2 + x|$ at the point $x_0 = -3$, is
 a) 3 b) -3 c) 0 d) Does not exist
18. The derivative of $F[f\{\phi(x)\}]$ is
 a) $F'[f\{\phi(x)\}]$ b) $F'[f\{\phi(x)\}]f\{\phi(x)\}$
 c) $F'[f\{\phi(x)\}]f'\{\phi(x)\}$ d) $F'[f\{\phi(x)\}]f'\{\phi(x)\}\phi'(x)$
19. $\frac{d}{dx} \sqrt{\frac{1-\sin 2x}{1+\sin 2x}}$ is equal to
 a) $\sec^2 x$ b) $-\sec^2 \left(\frac{\pi}{4} - x \right)$ c) $\sec^2 \left(\frac{\pi}{4} + x \right)$ d) $\sec^2 \left(\frac{\pi}{4} - x \right)$
20. If $f(x) = \sin x$ and $g(x) = \operatorname{sgn} \sin x$, then $g'(1)$ equals
 a) 0 b) $-\cos 1$ c) $\cos 1$ d) None of these
21. The value of $\frac{d}{dx} (|x - 1| + |x - 5|)$ at $x = 3$ is
 a) -2 b) 0 c) 2 d) 4
22. The derivative of $\cos^{-1} \left(\frac{1-x^2}{1+x^2} \right)$ with respect to $\cot^{-1} \left(\frac{1-3x^2}{3x-x^3} \right)$ is
 a) 1 b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{1}{2}$
23. If $y = \sin^{-1} \sqrt{1-x}$, then $\frac{dy}{dx}$ is equal to
 a) $\frac{1}{\sqrt{1-x}}$ b) $\frac{-1}{2\sqrt{1-x}}$ c) $\frac{1}{\sqrt{x}}$ d) $\frac{-1}{2\sqrt{x}\sqrt{1-x}}$

