

Topic :-DIFFERENTIATION

1. The derivative of $\cos^3 x$ w.r.t. $\sin^3 x$ is

a) $-\cot x$	b) $\cot x$	c) $\tan x$	d) $-\tan x$
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2. If $y = \log \left\{ \left(\frac{1+x}{1-x} \right)^{1/4} \right\} - \frac{1}{2} \tan^{-1} x$, then $\frac{dy}{dx} =$

a) $\frac{x}{1-x^2}$	b) $\frac{x^2}{1-x^4}$	c) $\frac{x}{1+x^4}$	d) $\frac{x}{1-x^4}$
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3. If $y = (x + \sqrt{1+x^2})^n$, then $(1+x^2) \frac{d^2y}{dx^2} + x \frac{dy}{dx}$ is

a) n^2y	b) $-n^2y$	c) $-y$	d) $2x^2y$
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4. The value of $\frac{d}{dx} \left[\tan^{-1} \left(\frac{\sqrt{x}(3-x)}{1-3x} \right) \right]$ is

a) $\frac{1}{2(1+x)\sqrt{x}}$	b) $\frac{3}{(1+x)\sqrt{x}}$	c) $\frac{2}{(1+x)\sqrt{x}}$	d) $\frac{3}{2(1+x)\sqrt{x}}$
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5. If $y = \tan^{-1} \left[\frac{\sin x + \cos x}{\cos x - \sin x} \right]$, then $\frac{dy}{dx}$ is equal to

a) $\frac{1}{2}$	b) $\frac{\pi}{4}$	c) 0	d) 1
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6. $x = \cos \theta, y = \sin 5\theta \Rightarrow (1-x^2) \frac{d^2y}{dx^2} - x \frac{dy}{dx}$ is

a) $-5y$	b) $5y$	c) $25y$	d) $-25y$
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7. If the function $f(x)$ is defined by $f(x) = a + bx$ and $f^r = fff \dots$ (repeated r times), then $f^r(x)$ is equal to

a) $a + b^r x$	b) $ar + b^r x$	c) $ar + bx^r$	d) $a \left(\frac{b^r - 1}{b - 1} \right) + b^r x$
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8. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is equal to

a) $(1 + \log x)^{-1}$	b) $(1 + \log x)^{-2}$	c) $\log x \cdot (1 + \log x)^{-2}$	d) None of these
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9. The derivative of $\sin^2 x$ with respect to $\cos^2 x$ is

a) $\tan^2 x$	b) $\tan x$	c) $-\tan x$	d) None of these
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10. If $x^p y^q = (x + y)^{p+q}$, then $\frac{dy}{dx}$ is equal to

a) $\frac{y}{x}$ b) $\frac{py}{qx}$ c) $\frac{x}{y}$ d) $\frac{qy}{px}$

11. If $y = (1 + x^2)\tan^{-1}x - x$, then $\frac{dy}{dx}$ is equal to

a) $\tan^{-1}x$ b) $2x\tan^{-1}x$ c) $2x\tan^{-1}x - 1$ d) $\frac{2x}{\tan^{-1}x}$

12. The derivative of $\sin^{-1}\left(\frac{\sqrt{1+x} + \sqrt{1-x}}{2}\right)$ with respect to x is

a) $-\frac{1}{2\sqrt{1-x^2}}$ b) $\frac{1}{2\sqrt{1-x^2}}$ c) $\frac{2}{\sqrt{1-x^2}}$ d) $\frac{-2}{\sqrt{1-x^2}}$

13. The derivative of $\tan^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right)$ is

a) $\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$ c) $\frac{1}{2\sqrt{1-x^2}}$ d) x

14. If $y = \tan^{-1}x + \cot^{-1}x + \sec^{-1}x + \operatorname{cosec}^{-1}x$, then $\frac{dy}{dx}$ is equal to

a) $\frac{x^2-1}{x^2+1}$ b) π c) 0 d) 1

15. If $y = \left(\frac{ax+b}{cx+d}\right)$, then $2\frac{dy}{dx}\frac{d^3y}{dx^3}$ is equal to

a) $\left(\frac{d^2y}{dx^2}\right)^2$ b) $3\frac{d^2y}{dx^2}$ c) $3\left(\frac{d^2y}{dx^2}\right)^2$ d) $3\frac{d^2x}{dy^2}$

16. If $y = (\log_{\cos x} \sin x)(\log_{\sin x} \cos x) + \sin^{-1}\frac{2x}{1+x^2}$, then $\frac{dy}{dx}$ at $x = \frac{\pi}{2}$ is equal to

a) $\frac{8}{(4+\pi^2)}$ b) 0 c) $-\frac{8}{(4+\pi^2)}$ d) None of the above

17. If $y = \tan^{-1}\left(\frac{a \cos x - b \sin x}{b \cos x + a \sin x}\right)$, then $\frac{dy}{dx}$ is equal to

a) 2 b) -1 c) $\frac{a}{b}$ d) 0

18. If $x = \cos \theta$, $y = \sin 5\theta$, then $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} =$

a) $-5y$ b) $5y$ c) $25y$ d) $-25y$

19. The differential coefficient of $\tan^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right)$ is

a) $\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$ c) $\frac{1}{2\sqrt{1-x^2}}$ d) x

20. If $f(x) = (x-2)(x-4)(x-6)\dots(x-2n)$, then $f'(2)$ is

a) $(-1)^n 2^{n-1}(n-1)!$ b) $(-2)^{n-1}(n-1)!$ c) $(-2)^n n!$ d) $(-1)^{n-1} 2^n (n-1)!$