

Name:		Roll No.		Subject	Math
Test Type	Only MCQs	Class	12 th	Date	
Chapter	02	Unit	02	Time	

Q. No. 1 Tick the best option

- If $f(x) = 3x^2 + 1$ and $f'(2) = \frac{f(x) - f(2)}{x - 2}$, then $f'(2) =$
 (a) 12 (b) 0 (c) $6x$ (d) 6
- $\frac{d}{dx} \left(\frac{ax^m + bx^n}{x} \right) =$
 (a) $mx^{m-1} + nx^{n-1}$ (b) $(m-1)x^{m-2} + (n-1)x^{n-2}$
 (c) $a(m-1)x^{m-2} + b(n-1)x^{n-2}$ (d) $max^{m-1} + nbx^{n-1}$
- If $y = \cos x^2$ then y' is
 (a) 12 (b) 0 (c) $6x$ (d) None
- $\frac{d}{dx} (\tan^{-1} x - \cot^{-1} x) =$
 (a) $\frac{2}{1+x^2}$ (b) $\frac{1}{1+x^2}$ (c) 0 (d) $\frac{x}{1+x^2}$
- $\frac{d}{dx} e^{\log(\sin x)} =$
 (a) $\frac{e^{\log(\sin x)}}{\cos x}$ (b) $\cos x$ (c) $\frac{e^{\log(\sin x)}}{\sin x} \cos x$ (d) $\frac{1}{\sin x} \cos x$
- The maximum value of $f(x)$ if
 (a) $\frac{1}{f(x)}$ (b) $f'(x)$ (c) $f''(x) < 0$ (d) $(f(x))^2$
- If $y = e^{ax}$ then y_4 is.
 (a) e^{ax} (b) $\frac{e^{ax}}{a}$ (c) $\frac{e^{ax}}{a^4}$ (d) $a^4 e^{ax}$
- If $y = \sin 3x$ then y_4 is.
 (a) $\frac{16}{81} y$ (b) $\frac{81}{16} y$ (c) $\frac{4}{9} y^1$ (d) $81y$
- If $f(x)$ is strictly increasing function then $f'(x)$ is
 (a) Positive (b) Negative (c) Zero (d) a and c
- The minimum value of $x^2 + 8x + 15$ is
 (a) 15 (b) 1 (c) -1 (d) -4
- If $f(x) = e^{2x}$ then $\frac{d}{dx} f'(x) =$
 (a) $\frac{1}{x}$ (b) $\frac{1}{y}$ (c) $\frac{2}{e^{2x}}$ (d) $4.y$
- Stationary point of the function $f(x) = x - e^x$ is at
 (a) $x = 0$ (b) $x = \ln 1$ (c) $x = e$ (d) Both a and b
- For what value of "x", $f(x) = 6x^2 - 7x$ and $g(x) = x^3 - 5x$ have same slope.
 (a) 0 (b) 4 (c) 1 (d) 2

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14. If $x = a \cos \theta \cos^2 \theta$, $y = b \sin^3 \theta$, then which is true?
 (a) $a \frac{dy}{dx} - b \tan \theta = 0$ (b) $a \frac{dy}{dx} = -b \tan \theta$ (c) $\frac{dy}{dx} = \frac{a}{b} \tan \theta$ (d) None of these
15. If $y = e^{10x}$ then $y_5 = ?$
 (a) e^{10x} (b) $100e^{10x}$ (c) $100000e^{10x}$ (d) None of these
16. If $x = 980t - 490t^2$, then the velocity at any instant $t = \frac{1}{2}$ is
 (a) 490cm/sec (b) 490cm (c) -490cm/sec (d) -390cm/sec
17. $\frac{d}{dx}(\sec x) = ?$
 (a) $\sec x \tan x$ (b) $-\cos - 2x$ (c) $\frac{-\cos^{-2} x}{\sqrt{1-x^2}}$ (d) None
18. $\frac{d}{dx} 3^{4x-5} = ?$
 (a) 3^{4x-5} (b) $3 \cdot 3^{4x-5}$ (c) $4 \cdot \ln 3 \cdot 3^{4x-5}$ (d) None
19. If $x = a \cos^3 \theta$, $y = a b \sin^3 \theta$, then which is true?
 (a) $a \frac{dy}{dx} - b \tan \theta = 0$ (b) $a \frac{dy}{dx} = b \tan \theta$ (c) $\frac{dy}{dx} = \frac{a}{b} \tan \theta$ (d) None of these
20. If $y = \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots + \infty}}}$, then which of the following is true?
 (a) $\frac{dy}{dx} = \sec^2 x$ (b) $\frac{dy}{dx} = \frac{\sec^2 x}{2y-1}$ (c) $\frac{dy}{dx} = \frac{1}{(2y-1)\cos^2 x}$ (d) Both b & c
21. The minimum and maximum values of the function $f(x) = \sin x + \cos x$ in the interval $[0, 2\pi]$ are respectively:
 (a) 2 and -2 (b) $-\sqrt{2}$ and $\sqrt{2}$ (c) -2 or 2 (d) -1 and 1
22. Derivative of $\sin^3 x$ w.r.t $\cos^2 x$ is:
 (a) $-\frac{2 \sin x}{3}$ (b) $\frac{2 \sin x}{3}$ (c) $\frac{3 \sin x}{2}$ (d) $\frac{3 \sin x}{2}$
23. Notation used by Cauchy for the derivative of $f(x)$ is:
 (a) $\frac{df}{dx}$ (b) $f'(x)$ (c) $f''(x)$ (d) $Df(x)$
24. $\frac{d}{dx} \sec^{-1} \left(\frac{x}{a} \right) =$
 (a) $\frac{a}{x\sqrt{a^2 - x^2}}$ (b) $\frac{x}{a\sqrt{x^2 - a^2}}$ (c) $\frac{a}{x\sqrt{x^2 - a^2}}$ (d) None of these
25. $\frac{d}{dx} (\ln x)^x =$
 (a) $\ln x + 1$ (b) $\ln x + x$ (c) $x \ln x$ (d) $x(\ln x)^{x-1}$

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27. $\frac{d}{dx}(x^n) = nx^{n-1}$, where
 (a) $n \in \mathbb{C}$, complex number (b) $n \in \mathbb{R}$, real numbers
 (c) $n \in \mathbb{Q}$, rational numbers (d) $n \in \mathbb{Q}^c$, irrational numbers
28. If $f(x) = 3 + x$, then
 (a) $f'(0) \neq f'(1)$ (b) $f'(0) = f'(1)$ (c) $f'(0) > f'(1)$ (d) $f'(0) < f'(1)$
29. Derivative of x^3 , w.r.t x^3 is.
 (a) 0 (b) 1 (c) x^3 (d) $3x^2$
30. $f(x) = \frac{1}{x-1} \Rightarrow f'(2) =$
 (a) 1 (b) 0 (c) -1 (d) -2
31. $\frac{d}{dx}(\cot x) =$
 (a) $-\operatorname{cosec}^2 x$ (b) $\operatorname{cosec}^2 x$ (c) $-\sin x$ (d) $\sec x \tan x$
32. If $y = \cos^{-1}\left(\frac{x}{a}\right)$, then $\frac{dy}{dx} =$
 (a) $\frac{-1}{\sqrt{a^2 - x^2}}$ (b) $\frac{1}{\sqrt{a^2 - x^2}}$ (c) $\frac{-1}{\sqrt{a^2 + x^2}}$ (d) $\frac{-1}{a\sqrt{a^2 - x^2}}$
33. $\frac{1}{x} \frac{d}{dx}(\sin x^2) =$
 (a) $2x \cos x^2$ (b) $\cos x^2$ (c) $2x \cos^2 x$ (d) $2 \cos x^2$
34. $\frac{d}{dx}(5^x - 2^x) =$
 (a) $5^x \ln 5 - 2^x \ln 2$ (b) $5^x \ln 5 + 2^x \ln 2$ (c) $5^x + 2^x$ (d) $5^x - 2^x$
35. $\frac{d}{dx}(\tanh^{-1} x) =$
 (a) $\frac{1}{1-x^2}$ (b) $\frac{1}{1+x^2}$ (c) $\frac{-1}{1-x^2}$ (d) $\frac{-1}{1+x^2}$
36. If $f(x) = \tan^{-1} x$, then $f'(\cot x) =$
 (a) $\frac{1}{x^2 + 1}$ (b) $\sin^2 x$ (c) $\cos^2 x$ (d) $\sec^2 x$
37. $\frac{d}{dx}(\cosh 3x) =$
 (a) $3 \operatorname{cosech} 3x$ (b) $-3 \sinh 3x$ (c) $3 \sinh 3x$ (d) $3 \cosh 3x$
38. If $f(x) = \sin x$, then $f'\left(\frac{2x+3}{x-1}\right) =$
 (a) $\cos\left(\frac{2x+3}{x-1}\right)$ (b) $-\cos\left(\frac{2x+3}{x-1}\right)$ (c) $\cos\left(\frac{x-1}{2x+3}\right)$ (d) $\cos x$

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39. If $f(x) = \sin x$, then $f'\left(-\frac{\pi}{2}\right) =$
(a) -1 (b) 0 (c) 0.5 (d) 1
40. Derivative of $\ln e^{x^2}$ w.r.t x is.
(a) $2x$ (b) $2e^{x^2}$ (c) $\frac{1}{2x^2}$ (d) $\frac{1}{x^2}$
41. $\frac{d}{dx} = ?$ where a is a constant;
(a) $2a$ (b) a (c) 0 (d) None
42. The minimum value of $f(x)$ if
(a) $\frac{1}{f(x)}$ (b) $f'(x)$ (c) $f''(x) > 0$ (d) $(f(x))^2$