BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

Date: 19/11/2021

Subject: Mathematics

Topic : Methods of Differentiation

Class: Standard XII

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1. If $y = (2x^2 + 6x)(2x^3 + 5x^2)$, then $\frac{dy}{dx} =$

   A. $20x^4 + 80x^3 + 90x^2$

   B. $20x^4 + 88x^3 + 90x^2$

   C. $16x^4 + 88x^3 + 90x^2$

   D. $16x^4 + 80x^3 + 90x^2$

2. If $y = \frac{4x^2}{x^3 + 3}$, then $\frac{dy}{dx} =$

   A. $\frac{-4x^4 + 24x}{(x^3 + 3)}$

   B. $\frac{-4x^4 + 24x}{(x^3 + 3)^2}$

   C. $\frac{4x^3 + 24x}{(x^3 + 3)^2}$

   D. $\frac{-4x^4}{(x^3 + 3)}$

3. If $y = e^{\tan 3x}$, then $\frac{dy}{dx} =$

   A. $e^{\tan 3x} \times \sec^2 3x$

   B. $3e^{\tan 3x} \times \sec^2 3x$

   C. $3e^{\tan 3x} \times \tan 3x$

   D. $3e^{\tan 3x} \times \sec 3x$

4. If $y = 2^{x^3}$, then $\frac{dy}{dx} =$

A. $3x^2(2^{x^3})$

B. $3x^2(2^{x^3}\log 2)$

C. $2^{x^3}\log 2$

D. $6^{x^2}\log 2$

5. If $f'(x) = \sqrt{2x^2 - 1}$ and $y = f(x^2)$, then $\frac{dy}{dx}$ at $x = 2$ is equal to

A. $2\sqrt{31}$

B. $4\sqrt{7}$

C. $4\sqrt{31}$

D. $2\sqrt{15}$

6. If $y = \log_7(2x - 3)$, then $\frac{dy}{dx} =$

A. $\frac{2}{(2x-3)\log 7}$

B. $\frac{2}{(2x-3)}$

C. $\frac{1}{(2x-3)\log 7}$

D. $\frac{1}{(2x-3)}$

7. If $y = e^{\sin\sqrt{x}}$, then $\frac{dy}{dx} =$

A. $\frac{e^{\cos\sqrt{x}}\sin\sqrt{x}}{2\sqrt{x}}$

B. $\frac{e^{\sin\sqrt{x}}}{2\sqrt{x}}$

C. $\frac{e^{\sin\sqrt{x}}\cos\sqrt{x}}{2\sqrt{x}}$

D. $\frac{e^{\sin\sqrt{x}}\cos\sqrt{x}}{\sqrt{x}}$

8. If $y = 3^{\log_9(1+\tan^2 x)},\ x \in \left(0, \frac{\pi}{2}\right)$, then $\frac{dy}{dx} =$

A. $\tan x$

B. $\sec x$

C. $\sec x \cdot \tan x$

D. $\sec^2 x$

9. If $g(x) = \frac{1}{x\sqrt{x^2+1}}$, then $g'(x) =$

A. $\frac{-2x^2-1}{x^2(x^2+1)^{\frac{5}{2}}}$

B. $\frac{2x^2+1}{x^2(x^2+1)^{\frac{3}{2}}}$

C. $\frac{-2x^2-1}{x^2(x^2+1)^{\frac{3}{2}}}$

D. $\frac{2x^2+1}{x^2(x^2+1)^{\frac{5}{2}}}$

10. If $y = a\sin x + b\cos x,\ (\text{ where } a, b \text{ are constant})$, then $y^2 + \left(\frac{dy}{dx}\right)^2$ is a

A. function of x

B. function of y

C. function of x and y

D. Constant

11. The derivative of $f(x) = |x|^3$ at $x = 0$ is

A. 0

B. 1

C. -1

D. Not defined

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

A. $\tan^{-1} x$

B. $2x\tan^{-1} x$

C. $2x\tan^{-1} x - 1$

D. $\frac{2x}{\tan^{-1} x}$

13. If $y = \tan^{-1}\left(\frac{\cos x}{1+\sin x}\right), x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, then $\frac{dy}{dx}$ is equal to

A. $\frac{1}{2}$

B. $-\frac{1}{2}$

C. 1

D. -1

14. If $y = \sqrt{x + \sqrt{y + \sqrt{x + \sqrt{y + \cdots \infty}}}}$, then $\frac{dy}{dx} =$

A. $\frac{y+x}{y^2-2x}$

B. $\frac{y^3-x}{2y^2-2xy-1}$

C. $\frac{y^3+x}{2y^2-x}$

D. $\frac{y^2-x}{2y^3-2xy-1}$

15. If $x = \frac{1-t}{1+t}$ and $y = \frac{2t}{1+t}$, then $\frac{d^2y}{dx^2}$ is equal to

A. $\frac{2t}{(1+t)^2}$

B. $\frac{1}{(1+t)^4}$

C. $\frac{2t^2}{(1+t)^2}$

D. 0

16. The derivative of $\ln x$ with respect to $\cot x$ is

A. $\dfrac{-\sin^2 x}{x}$

B. $\dfrac{\cos^2 x}{x}$

C. $\dfrac{-\sin^3 x}{x}$

D. $\dfrac{-\sin^2 x}{x^2}$

17. If $y = a\cos(\ln x) + b\sin(\ln x)$, then $x^2\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} =$

A. 0

B. y

C. $2y$

D. $-y$

18. If $x = a\cos\theta, y = b\sin\theta$, then $\dfrac{d^2y}{dx^2}$ is

A. $-\dfrac{3b}{a^3}\text{cosec}^4\theta\cot^4\theta$

B. $\dfrac{b}{a^2}\text{cosec}^2\theta$

C. $-\dfrac{b}{a^2}\text{cosec}^3\theta$

D. None of these

19. If $x = \frac{e^t + e^{-t}}{2}, y = \frac{e^t - e^{-t}}{2}$, then $\frac{dx}{dy} =$

A. $-\frac{x}{y}$

B. $\frac{y}{x}$

C. $\frac{x}{y}$

D. $-\frac{y}{x}$

20. If $y^x = x^{\sin y}$, then $\frac{dy}{dx} =$

A. $\frac{y}{x}\left[\frac{x \ln y - \sin y}{y \ln x \cdot \cos y - x}\right]$

B. $\frac{y}{x}\left[\frac{x \ln y + \sin y}{y \ln x \cdot \cos y + x}\right]$

C. $\frac{-y}{x}\left[\frac{x \ln y - \sin y}{y \ln x \cdot \cos y - x}\right]$

D. $\frac{y}{x}\left[\frac{x \ln y - \sin y}{y \ln x \cdot \cos y + x}\right]$