

Differentiation

1. If $y^2 = -4x + 3$, then $\frac{dy}{dx}$ at $x = \frac{1}{2}$.

- (1) 0 (2) 3
(3) -2 (4) 7

2. If $y = A \sin(kx - \omega t)$, then find $\frac{dy/dx}{dy/dt}$

- (1) $\frac{\omega}{k}$ (2) $\frac{k}{\omega}$
(3) $-\frac{k}{\omega}$ (4) $-\frac{\omega}{k}$

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

- (1) $e^x \sin x$ (2) $e^x \sin x + e^x \cos x$
(3) $e^x \cos x + \sin x$ (4) $e^x \cos x + e^x \cos x$

4. If $y = 2 \sin^2 \theta + \tan \theta$ then $\frac{dy}{d\theta}$

- (1) $4 \sin \theta \cos \theta + \sec \theta \tan \theta$
(2) $2 \sin 2\theta + \sec^2 \theta$
(3) $4 \sin \theta + \sec^2 \theta$
(4) $2 \cos^2 \theta + \sec^2 \theta$

5. Differentiation of $\sin(x^2)$ w.r.t x is

- (1) $\cos(x^2)$ (2) $2x \cos(x^2)$
(3) $x^2 \cos(x^2)$ (4) $-\cos(2x)$

6. If $y = \cos(\sin x^2)$, then at $x = \sqrt{\frac{\pi}{2}}$, $\frac{dy}{dx} =$

- (1) -2 (2) 2
(3) $-2\sqrt{\frac{\pi}{2}}$ (4) 0

7. If $y = \sin x$ & $x = 3t$ then $\frac{dy}{dt}$ will be

- (1) $3 \cos(x)$ (2) $\cos x$
(3) $-3 \cos(x)$ (4) $-\cos x$

8. If $y = x^2 \sin x + \frac{3x}{\tan x}$, then $\frac{dy}{dx}$ will be

- (1) $2x \sin x + x^2 \cos x + \frac{3 \tan x - 3x \sec^2 x}{\tan^2 x}$
(2) $2x \sin x + \frac{3x \sec^2 x - 3 \tan x}{\tan^2 x}$
(3) $\frac{x^2 \cos x + (3 \tan x - 3x \sec^2 x)}{\tan^2 x}$
(4) $\frac{x^2 \cos x - 2x \sin x - (3 \tan x - 3x \sec^2 x)}{\tan^2 x}$

9. $\frac{d}{dx} \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2 =$

- (1) $1 - \frac{1}{x^2}$ (2) $1 + \frac{1}{x^2}$
(3) $1 - \frac{1}{2x}$ (4) None of these

10. If $y = \frac{1}{a-z}$, then $\frac{dz}{dy} =$

- (1) $(z-a)^2$
(2) $-(z-a)^2$
(3) $(z+a)^2$
(4) $-(z+a)^2$