Parishram (2025)

Physics

Basic Mathematics

DPP: 6

Q1 $\frac{d}{dx}(\sin 30^\circ)$ is equal to
(A) $\cos 30^\circ$
(B) $\operatorname{cosec} 30^\circ$
(C) 0
(D) $\sin 30^\circ$

Q2 If $y = 4x^2 - 2x + 4$ then find $\frac{dy}{dx}$
(A) $8x - 2x$ (B) $8x - 2$
(C) $8x - 2 + 4$ (D) $4x + 4$

Q3 $y = 2t(3 - t)$ then find $\frac{dy}{dt}$.
(A) $6 - 8t$ (B) $6 - 4t$
(C) $6 + 5t$ (D) None of these

Q4 If $y = x^2 + 4x^3 - 8x + 4$, then find $\frac{dy}{dx}$
(A) $2x + 4x^2 - x$
(B) $2x + 12x^2 - 8$
(C) $2x + 4x^3 - 8$
(D) $2x + 12x^2 - x$

Q5 Find $\frac{dv}{dt}$ at $t = 2$, if $v = 2t^2 + 4t$
(A) 4 (B) 8
(C) 12 (D) 16

Q6 $\frac{d}{dx}\left(1 + \frac{1}{x^2} + \frac{1}{x^3}\right)$
(A) $x + \frac{1}{x^2} + \frac{1}{x^3}$
(B) $\frac{-2}{x^3} - \frac{3}{x^4}$
(C) $x - \frac{1}{x^2} - \frac{3}{x^3}$
(D) $\frac{-2}{x} - \frac{3}{x^2}$

Q7 $y = \sec x + \tan x$, value of $\frac{dy}{dx}$ is:
(A) $\sec^2 x + \tan x$
(B) $\tan^2 x + \sec x$
(C) $\sec x(\tan x + \sec x)$
(D) $\sec x(1 + \sec x)$

Q8 $\frac{d}{dx}(\sin x \operatorname{cosec} x)$ is:
(A) $\sin^2 x - \operatorname{cosec}^2 x$
(B) x
(C) 0
(D) 1

Q9 $\frac{d}{dx}\left(1 + \frac{1}{x} + \log x + \tan x\right) =$
(A) $1 - \frac{1}{x^2} + \sec^2 x$
(B) $1 + \frac{1}{x^2} + \sec^2 x$
(C) $1 + \frac{1}{x^2} + \frac{1}{x} + \sec^2 x$
(D) $-\frac{1}{x^2} + \frac{1}{x} + \sec^2 x$

Q10 $\frac{d}{dx}\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$ is equal to:
(A) $1 + \frac{1}{x^2}$
(B) $-1 + \frac{1}{x^2}$
(C) $1 - \frac{1}{x^2}$
(D) $x^2 - 1$

Q11 $y = (1 - x^2)^{10}$, then find $\frac{dy}{dx}$
(A) $10(1 - x^2)^9$
(B) $10(1 - x^2)^9 x^2$
(C) $-20x(1 - x^2)^9$
(D) Not differentiable

Q12 If $y = A\sin(kx - \omega t)$, then find $\frac{dy/dx}{dy/dt}$
(A) $\frac{\omega}{k}$
(B) $\frac{k}{\omega}$
(C) $\frac{-k}{\omega}$
(D) $\frac{-\omega}{k}$

Q13 If $y = (2 - x^2)^4$, then find $\frac{dy}{dx}$
(A) $4(2 - x^2)^3 \times (2x)$
(B) $4(2 - x^2)^3$
(C) $4(2 - x^2) \times 2x$
(D) $-8x(2 - x^2)^3$

Q14 If $y = \frac{x}{x+1}$ then find $\frac{dy}{dx}$
(A) $\frac{1}{(x+1)^2}$

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

(C) $(x+1)^2$

(D) 1

Answer Key

Q1	(C)
Q2	(B)
Q3	(B)
Q4	(B)
Q5	(C)
Q6	(B)
Q7	(C)
Q8	(C)
Q9	(D)
Q10	(C)
Q11	(C)
Q12	(C)
Q13	(D)
Q14	(A)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Text Solution:

Here we have given

$\frac{d}{dx}\left(x^2+4x^3-8x+4\right)=12x^2+2x-8$

Steps

$\frac{d}{dx}\left(x^2+4x^3-8x+4\right)$

Apply the Sum/Di erence Rule:

$(f\pm g)'=f'\pm g'$

$=\frac{d}{dx}\left(x^2\right)+\frac{d}{dx}\left(4x^3\right)-\frac{d}{dx}\left(8x\right)+\frac{d}{dx}\left(4\right)$

$\frac{d}{dx}\left(x^2\right)=2x$

$\frac{d}{dx}\left(4x^3\right)=12x^2$

$\frac{d}{dx}\left(8x\right)=8$

$=2x+12x^2-8+0$

Simplify

$=12x^2+2x-8$

Hence option B is correct.

Video Solution:

Q5 Video Solution:

Q6 Video Solution:

Q7 Video Solution:

Q8 Video Solution:

Q9 Text Solution:

Here we have

$\frac{d}{dx}\left(1+\frac{1}{x}\ln\left(x\right)+\tan\left(x\right)\right)=\frac{-\ln(x)+1}{x^2}+\sec^2\left(x\right)$

Steps

$\frac{d}{dx}\left(1+\frac{1}{x}\ln\left(x\right)+\tan\left(x\right)\right)$

Simplify $1+\frac{1}{x}\ln\left(x\right)+\tan\left(x\right)$: $1+\frac{\ln(x)}{x}+\tan\left(x\right)$

$=\frac{d}{dx}\left(1+\frac{\ln(x)}{x}+\tan\left(x\right)\right)$

Apply the Sum/Difference Rule:

$(f\pm g)'=f'\pm g'$

$=\frac{d}{dx}\left(1\right)+\frac{d}{dx}\left(\frac{\ln(x)}{x}\right)+\frac{d}{dx}\left(\tan\left(x\right)\right)$

$\frac{d}{dx}\left(1\right)=0$

$\frac{d}{dx}\left(\frac{\ln(x)}{x}\right)=\frac{1-\ln 0}{x^2}$

$\frac{d}{dx}\left(\tan\left(x\right)\right)=\sec^2\left(x\right)$

$= 0 + \frac{1-\ln(x)}{x^2} + \sec^2\left(x\right)$

$= \frac{-\ln(x)+1}{x^2} + \sec^2\left(x\right)$

Hence option D is correct

Video Solution:

Q10 Video Solution:

Q11 Video Solution:

Q12 Video Solution:

Q13 Video Solution:

Q14 Video Solution: