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Pharmacy

19/MHS/1/1130

1. $y = 1/x-2$

The function is defined for all real number except

$x = 2$

$\therefore$ at $x = 2$

* domain = all real number except $x = 2$
* co-domain = all real number except $y = 2$

2. $K = \ln v$

$d/dK(\ln v) = \frac{1}{v}$

3a. $2x - 3y - 2 = 0$

$2x - 2 = 3y$

$y = \frac{2x-2}{3}$

b) $x^2 + y^2 = 4$

$y^2 = 4 - x^2$

$y = \pm\sqrt{4 - x^2}$

4) $P = \sin^{-1} t$

$P = t/\sin$

$t = \sin P$ ... ①

Recall that $\sin^2 P + \cos^2 y = 1$ ...... ②

$\frac{dt}{dp}$ of(T) $= \cos p$

from(2) $\sin^2 P + \cos^2 P = 1$

$\cos^2 P = 1 - \sin^2 P$

$\cos P = \sqrt{1 - \sin^2 P}$

$\frac{dt}{dp} = \cos P = \sqrt{(1 - t)^2}$

5 $f(x) = 2x^2 - 5 \quad g(x) = 4x - 2$

i) $fog(x)$ (ii) $gof(x)$

i) $fog(x)$

$= 2(4x-2)^2 - 5$

$= 2(16x^2 - 16x + 4) - 5$

$= 32x^2 - 32x + 8 - 5$

$= 32x^2 - 32x + 3$

ii) $gof(x)$

$= 4(2x^2 - 5) - 2$

$= 8x^2 - 20 - 2$

$= 8x^2 - 22$

6 $f(x) = 3x^2 - 2x + 1 = 0$

$fe(x) = \frac{f(x) + f(-x)}{2}$

$f(-x) = 3(-x)^2 - 2(-x) + 1$

$f(x) = 3x^2 + 2x + 1$

$$f_e(x) = \frac{3x^2-2x+1+3x^2+2x+1}{2}$$

$$f_e(x) = \frac{6x^2+2}{2}$$

$$f_o(x) = \frac{f(x) - f(-x)}{2}$$

$$f_o(x) = \frac{3x^2-2x+1-3x^2-2x-1}{2} = \frac{-4x}{2} = \underline{\underline{-2x}}$$

$$f(x) = f_e(x) + f_o(x)$$
$$= \frac{6x^2+2}{2} - 2x = \underline{\underline{3x^2-2x+1}}$$

7 $y = \cos x$

$y + dy = \cos(x + \delta x)$

$dy = \cos(x+dx) - \cos x$ — (1)

Recall

$\cos(A+B) - \cos(A-B) = -2\sin A \sin B$ — (2)

Comparing (1) \$ (2)

$A + B = x + \delta x$ — (3)

$A - B = x$ — (4)

Adding (3) \$ (4) subtracting (3) \$ 4

$2A = 2x + dx$ while $B = dx/2$

$A = x + dx/2$

Compare ① & ②

$dy = \cos(x+dx) - \cos x$

$= 2\sin(x + \frac{dx}{2}) \sin(dx/2)$

dividing through by dx

$dy/dx = \dfrac{-2\sin(x+\frac{dx}{2})\sin(dx/2)}{dx}$

$dy/dx = -\dfrac{\sin(x+dx/2)\sin(dx/2)}{dx/2}$

$= -\sin(x+dx/2) \times \dfrac{\sin(dx/2)}{dx/2}$

Taking limit $dx \to 0$

$\lim_{dx\to 0} \dfrac{\sin dx/2}{dx/2} = 1$

$\lim_{dx \to 0} dy/dx = -\sin(x + \frac{0}{2}) \times 1$

$dy/dx = -\sin x$

8, $y = 3t^2$; $x = 1/t^2$

$dy/dx = dy/dt \times \dfrac{dt}{dx}$

$dy/dt = 6t$; $\dfrac{dx}{dt} = \dfrac{-2}{t^3}$

$dy/dx = 6t \div \dfrac{-2}{t^3}$

$= 6\cancel{t} \times \dfrac{-2}{\cancel{t^3}}$

$= 6\cancel{t} \times \dfrac{-2}{t^2} = \dfrac{12}{t^2}$

$dy/dx = \dfrac{-12}{t^2}$

9) $y = x^2 \cos 2x e^{4x}$

taking $\log_e$ on both sides

$\ln y = \ln x^2 + \ln\cos 2x + \ln e^{4x}$

$\frac{1}{y} dy/dx =$

$\dfrac{2}{x} - \dfrac{2\sin 2x}{\cos 2x} + 4$

multiplying both sides by y

$$dy/dx = y\left(\frac{2}{x} - \frac{2\sin 2x}{\cos 2x} + 4\right)$$

$$= x^2\cos 2x\, e^{4x} \times \frac{2}{x} - \frac{2\sin x}{\cos x} + 4$$

10) $y = \sin(3x^3+5)$

$y = \sin(3x^2+5)$

let $u = 3x^3+5$ $dy/dx = 9x^2$

$y = \sin u$ $dy/dx = \cos u$

$dy/dx = dy/du \times du/dx$

$= \cos u \times 9x^2$

$dy/dx = 9x^2 \cos u$

but $u = 3x^3+5$

$dy/dx = 9x^2\cos(3x^3+5)$