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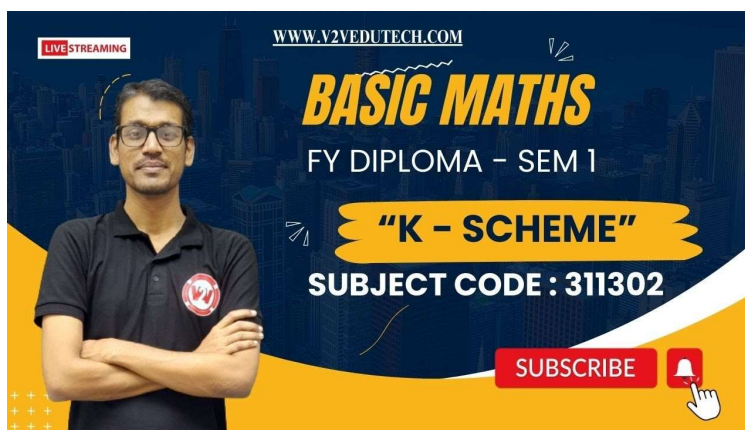
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YouTube Lecture Links & Notes :

Lecture 4: Function: <https://www.youtube.com/Functions M1>

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LIVESTREAMING

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BASIC MATHS

FY DIPLOMA – SEM 1

“K – SCHEME”

SUBJECT CODE : 311302

SUBSCRIBE

$$f(x) = f(-x)$$

↳ Even function

$$f(x) = -f(-x)$$

↳ Odd function

$$f(x) \neq f(-x)$$

↳ Neither even
Nor odd //

$$\sin(x) \Rightarrow (-x) \Rightarrow \sin(-x) = -\sin x \quad \text{--- odd}$$

$$\cos(x) \Rightarrow (-x) \Rightarrow \cos(-x) = \cos x \quad \text{--- even function}$$

$$\tan(x) \Rightarrow (-x) \Rightarrow \tan(-x) = -\tan x \quad \text{--- odd}$$

$$\csc(x) \Rightarrow (-x) \Rightarrow \csc(-x) = -\csc x \quad \text{--- odd function}$$

$$\sec(x) \Rightarrow (-x) \Rightarrow \sec(-x) = \sec x \quad \text{--- even function}$$

$$\operatorname{cosec}(x) \Rightarrow (-x) \Rightarrow \operatorname{cosec}(-x) = -\operatorname{cosec} x \quad \text{--- odd function}$$

$$\log_x (a \times b) = \log_x a + \log_x b$$

$$\log \left(\frac{a}{b} \right) = \log a - \log b$$

$$\# \log a^x = x \cdot \log a$$

$$\log_b b = 1$$

$$\log_x 1 = 0$$

$$a^0 = 1$$

$$\frac{a}{0} = \infty$$

$$\frac{0}{a} = 0$$

$$a \times 0 = 0$$

$$\frac{1}{x} = x^{-1}$$

$$\sqrt{x} = x^{1/2}$$

$$\sqrt[5]{x} = x^{1/5}$$

$$5\sqrt{x} = 5 \cdot x^{1/2}$$

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

Q1 $g^* f(x) = 64^x + \log x$ find $f(1/3)$

$$\Rightarrow f(x) = 64^x + \log x$$

$$f(1/3) = 64^{(1/3)} + \log\left(\frac{1}{3}\right)$$

$$= 4 + [\log 1 - \log 3]$$

$$= 4 + [0 - \log 3]$$

$$= 4 + (-\log 3)$$

$$f(1/3) = 4 - \log 3 //$$

$f(x) = 16^x - \log_4 x$ find $f(1/4)$

$$\begin{aligned} \Rightarrow f(x) &= 16^x - \log_4 x \\ f(1/4) &= 16^{(1/4)} - \log_4\left(\frac{1}{4}\right) \\ &= 2 - [\log_4 1 - \log_4 4] \\ &= 2 - [0 - 1] \\ &= 3 // \end{aligned}$$

$* f(x) = \frac{x^2+1}{x^3-1}$ find $f(-1)$ & $f(1/2)$

$* f(x) = x^2 + 2x - 5$
find $f(-2)$ & $f(3)$

$f(x) = 3 + \log_4 x$
find $f(1/4)$

$$\begin{aligned} \Rightarrow f(x) &= 3 + \log_4 x \\ f(1/4) &= 3 + \log_4\left(\frac{1}{4}\right) \\ &= 3 + [\log_4 1 - \log_4 4] \\ &= 3 + [0 - 1] \\ &= 2 // \end{aligned}$$

$f(x) = \log_4 x + 8$ find $f(1/4)$

$$\begin{aligned} \Rightarrow f(x) &= \log_4 x + 8 \\ f(1/4) &= \log_4\left(\frac{1}{4}\right) + 8 \\ &= [\log_4 1 - \log_4 4] + 8 \\ &= [0 - 1] + 8 \\ &= 7 // \end{aligned}$$

$$f(x) = \frac{x^2 + 9}{\sqrt{x-3}}$$

find $f(4) + f(5)$

$$\Rightarrow f(x) = \frac{x^2 + 9}{\sqrt{x-3}}$$

$$f(x) = \frac{x^2 + 9}{\sqrt{x-3}}$$

$$f(4) = \frac{4^2 + 9}{\sqrt{4-3}}$$

$$f(5) = \frac{5^2 + 9}{\sqrt{5-3}}$$

$$= \frac{16+9}{\sqrt{1}}$$

$$= \frac{25+9}{\sqrt{2}}$$

$$= \frac{25}{1}$$

$$= \frac{34}{\sqrt{2}}$$

$$f(4) = 25$$

$$= 24.0416$$

$$f(5) \approx 24.042 //$$

$$f(4) + f(5) = 25 + 24.042$$
$$= 49.042 //$$

Show that $f(0) = -2f(3)$

if $f(x) = x^3 - 5x^2 - 4x + 20$

Show that $f(-1) = 3f(1)$

if $f(x) = 3x^2 - 5x + 7$

$$\Rightarrow \text{LHS} = f(0)$$
$$= 0^3 - 5(0)^2 - 4(0) + 20$$
$$= 0 - 0 - 0 + 20$$
$$= 20 \quad \text{--- ①}$$

$$\text{RHS} = -2f(3)$$
$$= -2 [3^3 - 5(3)^2 - 4(3) + 20]$$
$$= 20 // \quad \text{--- ②}$$

Hence from ① & ②

$$\text{LHS} = \text{RHS}$$

$$\therefore f(0) = -2f(3)$$

$$f(x) = px^2 + 11$$

⊗ $f(-1) = 15$ find p

⇒

$$f(x) = px^2 + 11$$

$$\underline{f(-1)} = p(-1)^2 + 11$$

$$15 = p(-1)^2 + 11$$

$$15 = p(1) + 11$$

$$15 - 11 = p$$

$$\boxed{4 = p}$$

$$f(x) = ax^2 - bx - 1$$

$$f(2) = 5$$

$$f(-2) = 10$$

find a & b

⇒

$$f(x) = ax^2 - bx - 1$$

$$f(2) = a(2)^2 - b(2) - 1$$

$$5 = 4a - 2b - 1$$

$$5 + 1 = 4a - 2b$$

$$6 = 4a - 2b \quad \text{--- (1)}$$

$$f(x) = ax^2 - bx - 1$$

$$f(-2) = a(-2)^2 - b(-2) - 1$$

$$10 = a(4) + b(2) - 1$$

$$10 + 1 = 4a + 2b$$

$$11 = 4a + 2b \quad \text{--- (2)}$$

$$6 = 4a - 2b \quad \text{--- (1)}$$

$$11 = 4a + 2b \quad \text{--- (2)}$$

$$17 = 8a - 0$$

$$\frac{17}{8} = a = 2.125$$

$$\text{eq}^n \text{ (1)} \Rightarrow 6 = 4a - 2b$$

$$6 = 4(2.125) - 2b$$

$$2b = 4(2.125) - 6$$

$$2b = 2.5$$

$$\therefore b = \frac{2.5}{2} = 1.25 //$$

state function even or odd

$$* f(x) = x^3 - 5x + \sin x + x \cos x$$

$$\Rightarrow f(x) = \underline{x^3} - \underline{5x} + \underline{\sin x} + \underline{x \cdot \cos x}$$

$$f(-x) = \underline{(-x)^3} - \underline{5(-x)} + \underline{\sin(-x)} + \underline{(-x) \cdot \cos(-x)}$$

$$= -x^3 + 5x + (-\sin x) + (-x) \cdot \cos x$$

$$= \underline{-x^3} + \underline{5x} - \underline{\sin x} - \underline{x \cdot \cos x}$$

$$f(-x) = -f(x)$$

↳ \therefore function is odd,

$$* f(x) = \underline{3x^4} + \underline{x^2} + \underline{5} - \underline{3 \cos x} + \underline{2(\sin x)^2}$$

$$\Rightarrow f(-x) = 3(-x)^4 + (-x)^2 + 5 - 3 \cos(-x) + 2[\sin(-x)]^2$$

$$\begin{aligned} (-1)^{\wedge 2} &= 3x^4 + x^2 + 5 - 3 \cos x + 2[-\sin x]^2 \\ &= \underline{3x^4} + \underline{x^2} + \underline{5} - \underline{3 \cos x} + \underline{2(\sin x)^2} \end{aligned}$$

$$f(-x) = f(x)$$

↳ \therefore function is Even,

$$f(x) = \underline{x^3} + \underline{4x} + \underline{\sin x}$$

$$\Rightarrow f(-x) = (-x)^3 + 4(-x) + \sin(-x)$$

$$= \underline{-x^3} - \underline{4x} - \underline{\sin x}$$

$$(-1)^{\wedge 3}$$

$$f(-x) = -f(x)$$

↳ \therefore function is odd,

Q. Define Even & odd function
with suitable example.

⇒

Even function ⇒

Given function is even
when $f(x) = f(-x)$

Eg. $f(x) = x^2$
 $f(-x) = (-x)^2$
 $= x^2$
 $= f(x)$

∴ function is Even

Define Implicit function.

$$y = ax^2 + bx + c$$

$f(x) =$ explicit
function,,

$$x^2 + xy + y^2 = c$$

$f(x, y) =$ Implicit
function