

~~$$f(x) = \cos^2 x \times x - \sin^2 x + \tan x = f(x)$$~~

$$f(x) = \cos^2 x \times x - \sin^2 x + \tan x = f(x) \quad (1)$$

$$\lim_{x \rightarrow 0^+} f(x) = 0 \xrightarrow{\text{هوسپيال}} \frac{f'(x)}{1} = 0 \Rightarrow f'(0^+) = 0 \Rightarrow 4x0 = 0$$

$$\hookrightarrow x=0 \Rightarrow 1+0+b=0 \Rightarrow b=-1$$

$$\lim_{x \rightarrow 0^-} f'(x) = 2 \xrightarrow{\text{هوسپيال}} \frac{f''(x)}{1} = 2 \Rightarrow f''(0^-) = 2$$

$$a+b=V-1=4$$

~~$$f'(x) = (-2 \cos^2 x)(\sin^2 x) + \tan x$$~~
~~$$f'(x) = (-2)(-2 \cos^2 x \sin^2 x)$$~~

$$\hookrightarrow f''(x) = (-2)(-2 \sin^2 x \sin^2 x + 2 \cos^2 x \cos^2 x) + \sec^2 x$$

$$\xrightarrow{x=0} f''(0) = -2(0+2) + \sec^2 0 = 2 \Rightarrow 2a - 12 = 2 \Rightarrow 2a = 14 \Rightarrow a = 7$$

$f(x) = x^p + ax^r + bx + c \rightarrow f'(x) = px^{p-1} + ra + b$ (9)

$C = f \leftarrow \begin{cases} x=0 \rightarrow f'(0) = 0 \Rightarrow b = 0 \end{cases}$

$\Rightarrow f'(x) = x(px + ra)$ $f(x) = \left(\frac{-ra}{p}\right)^p + a\left(\frac{-ra}{p}\right)^r + c = 0$

$\hookrightarrow x = \frac{-ra}{p}$ $\underbrace{\hspace{10em}} = -f$

$\Rightarrow \frac{-1a^p}{pv} + \frac{ra^p}{p} = \frac{ra^p}{pv} = -f \Rightarrow a^p = -pv \Rightarrow a = -p$

$\frac{-ra}{p} \Rightarrow \frac{-p(-p)}{p} = p \rightarrow$ طول هيسيم نسبا تاج

$f(x) = x^4 - 4x^2 + c \Rightarrow f'(x) = 4x^3 - 8x \Rightarrow 4x(x^2 - 2)$ (10)

$\rightarrow \frac{-\sqrt{2} \quad 0 \quad \sqrt{2}}{- \quad + \quad - \quad +} \rightarrow f''(x) = 12x^2 - 8 \Rightarrow x = \pm 1 \rightarrow$ نقاط عطف

$\Rightarrow A(\sqrt{2}, -4) \quad B(-\sqrt{2}, -4)$

$C(1, 0) \quad D(-1, 0) \rightarrow m = 0 \quad \hookrightarrow m = 0$

خطوط AB و CD متوازيين هيسيم و موازي هيسيم و زاوية هيسيم

$$y = x^3 + ax^2 + bx - 1 \Rightarrow y' = 3x^2 + 2ax + b \quad x = -1 \rightarrow y' = 3 - 2a + b = 0$$

$$\left. \begin{array}{l} x = -1 \\ y = -1 + a - b - 1 = -2 + a - b = -4 \end{array} \right\}$$

$$\Rightarrow \begin{cases} -2a + b = -3 \\ a - b = -2 \end{cases}$$

$$\Rightarrow a = 1, b = -1 \Rightarrow \frac{a}{b} = \frac{1}{-1}$$

$$g(x) = \frac{\mu}{\nu} \sin x \quad f(x) = \sin x + \frac{1}{\nu} \cos x \quad (5)$$

$$\frac{\mu}{\nu} \sin x = \sin x + \frac{1}{\nu} \cos x \Rightarrow \sin x = \cos x \quad x \in [0, \pi] \rightarrow x = \frac{\pi}{4}$$

$$\Rightarrow f(x) \frac{\mu\sqrt{\nu}}{\nu} \quad f'(x) = \cos x - \frac{1}{\nu} \sin x \quad x = \frac{\pi}{4} \rightarrow \frac{\sqrt{\nu}}{\nu} - \frac{\sqrt{\nu}}{\nu} = \frac{\sqrt{\nu}}{\nu} = f'(\frac{\pi}{4})$$

$$y = \frac{\sqrt{\nu}}{\nu} x + b \quad \begin{matrix} x = \frac{\pi}{4} \\ y = \frac{\mu\sqrt{\nu}}{\nu} \end{matrix} \Rightarrow b = \frac{\mu\sqrt{\nu}}{\nu} - \frac{\pi\sqrt{\nu}}{4\nu}$$

$$\rightarrow \frac{\sqrt{\nu}}{\nu} x = \frac{-\pi\sqrt{\nu}}{4\nu} + \frac{\mu\sqrt{\nu}}{\nu} \Rightarrow \cancel{\dots} \quad x = \mu - \frac{\pi}{\nu}$$

$$f(x) = 2x^3 - 3x^2 - 12x + 1 \Rightarrow f'(x) = 6x^2 - 6x - 12 = 6(x-2)(x+1) \quad (6)$$

$$A = (2, -12) \quad B = (-1, 12) \Rightarrow m = \frac{12+12}{-1-2} = -9$$

$$\Rightarrow 6x^2 - 6x - 12 = -9 \Rightarrow 2x^2 - 2x - 1 = 0 \quad \Delta = 4+8 > 0 \rightarrow \text{نقطتان حقيقيتان}$$

$$y = kx^k + (k+1)x^k = x^k(kx+k+1) \quad (7)$$

$$y' = k^2 x^{k-1} + (2k+1)x^k$$

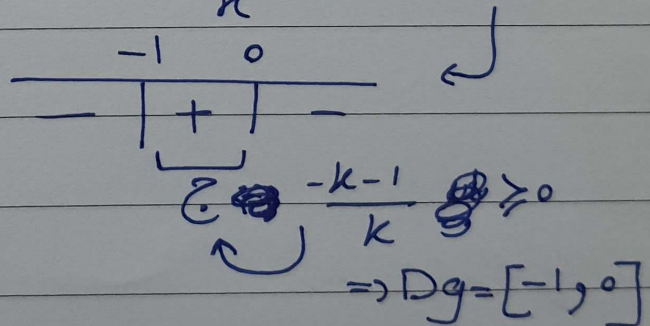
$$L > kx+k+1 = 0 \Rightarrow kx = -k-1$$

$$\Rightarrow x = -\frac{k+1}{k} \rightarrow k = -1, 0$$

$$\Rightarrow y'' = 4kx + 2k + 1 = 0$$

$$4kx = -2k-1$$

$$\Rightarrow x = -\frac{2k+1}{4k} \neq 0$$



$$\Rightarrow Df = (-\infty, -1] \cup [0, +\infty)$$

$$\Rightarrow Df \cap Dg = \{-1, 0\}$$

$$k = -1 \leftarrow \text{نقطة التقاطع}$$

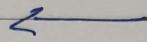
وعند $x = 0$

$$y = x^p - 1 \Rightarrow y' = px$$

$$px(-px) = -1 \Rightarrow -px^2 = -1 \quad (P)$$

$$\Rightarrow x = \pm \frac{1}{p} \Rightarrow y = x^p - 1 = \frac{1}{p} - 1$$

$$\left(-\frac{p}{p} \right) \times p = \left(-\frac{p}{p} \right)$$



$$\Rightarrow y = -\frac{p}{p}$$

$$m = \frac{a - (-1x)}{p(a - (-1/a))} = 1 \Rightarrow y = 1x - 1$$

$$f(x) = \frac{a}{px-1}$$

$$1x - 1 = \frac{a}{px-1}$$

$$\Rightarrow f'(x) = \frac{(-a)(p)}{(px-1)^2} = 1 \Rightarrow \frac{-a}{(px-1)^2} = p$$

$$\Rightarrow a = (-1) \left(\frac{1}{p} \right)^2 (px-1)^2 = (1x-1)(px-1)$$

$$\Rightarrow -fx^2 + fx - 1 = fx^2 - px + 1 \Rightarrow px^2 - 2fx + 2 = 0$$

$$\Rightarrow x = 1, x = \frac{1}{p} \Rightarrow x = 1 \Rightarrow a = -p$$

$$\Rightarrow f(a) = \frac{-p}{1-1} = -\frac{1}{p} \Rightarrow \boxed{f(a) = -\frac{1}{p}}$$

$$y = \frac{x+a}{ax+1} \xrightarrow{\text{L'Hopital}} \frac{(1+a) - a(1+a)}{(1+a)^2} = p$$

$$\Rightarrow pa^2 + fa + p = 1 - a^2 \Rightarrow pa^2 + fa + 1 = 0 \Rightarrow a = -1, a = -\frac{1}{p}$$

$$y = \frac{x - \frac{1}{p}}{-\frac{1}{p}x + 1} \xrightarrow{y=1} (1,1) \rightarrow y = px + b \Rightarrow 1 = p + b$$

$$\underline{a - b = \left(-\frac{1}{p}\right) - (-1) = \frac{p}{p}} \leftarrow b = -1$$