

$$g(x) = f(\tan^2 x + \sqrt{r} \cos x)$$

$$g'(\frac{\pi}{4}) = \sqrt{r}$$

$$f'(r) = ?$$

$$f(x) = \frac{A + \cos^2 x}{r - \cos^2 x}$$

$$f'(x)$$

$$g(x) = \frac{r}{r - \cos x}$$

$$f'(\frac{\sqrt{\pi}}{4}) - r g'(\frac{\sqrt{\pi}}{4}) = ? \quad \text{سوال ②}$$

$$f(x) = |rx - r| \sqrt{ax} \quad x = \frac{r}{f} \quad r\sqrt{a} \quad a = ?$$

$$\text{if } x > \frac{r}{f} \Rightarrow (rx - r) \sqrt{ax} = f(x) \Rightarrow f'_+(x) = \frac{\sqrt{a}}{r\sqrt{x}} (rx - r) + \sqrt{ax} \Rightarrow f'_+(\frac{r}{f}) = r\sqrt{ra}$$

$$\text{if } x < \frac{r}{f} \Rightarrow f(x) = -(rx - r) \sqrt{ax} \Rightarrow f'_-(x) = \frac{\sqrt{a}}{r\sqrt{x}} (r - rx) - \sqrt{ax} \Rightarrow f'_-(\frac{r}{f}) = -r\sqrt{ra}$$

$$r\sqrt{ra} - (-r\sqrt{ra}) = r\sqrt{ra} = r\sqrt{a} \Rightarrow \boxed{a = \frac{1}{r}}$$

$$y = ax + r$$

$$f(\epsilon) + f'(\epsilon) = -1$$

$$f'(\epsilon) = ?$$

$$\text{سوال ③}$$

$$x = \epsilon \Rightarrow y = f(x) \Rightarrow y' = f'$$

$$y' = a \quad f(\epsilon) = \epsilon a + r \Rightarrow (\epsilon a + r) + a = -1 \Rightarrow \omega a + r = -1 \Rightarrow \omega a = -r \Rightarrow$$

$$a = -\frac{r}{\omega} \Rightarrow \boxed{f'(\epsilon) = -\frac{r}{\omega}}$$

$$vy - x = a \Rightarrow vy = a + x \Rightarrow y = \frac{x+a}{v}$$

سؤال ٥

$$y = \frac{ax-1}{x+1} \Rightarrow \frac{x+a}{v} = \frac{ax-1}{x+1} \Rightarrow (x+1)(x+a) = (ax-1)v \Rightarrow$$

$$a = ? \quad vx^2 + (14x + a) = vax - v \Rightarrow vx^2 + (14 - va)x + 12 = 0 \quad \Delta = 0 \quad \text{بأنه لا يوجد جذور}$$

$$\Rightarrow v(x-2)^2 = 0, \quad 14 - va = -12 \Rightarrow va = 26 \Rightarrow a = 2$$

$$f(x) = x^3 + ax - b \quad f(r) = 0$$

سؤال ٦

$$x = 2 \quad f'(x) = 3x^2 + a \Rightarrow f'(2) = 3(2)^2 + a = 12 + a = 0 \Rightarrow a = -12$$

$$b - a = ?$$

$$f(2) = 8 + 2(-12) - b = 0 \Rightarrow b = -14$$

$$b - a = -14 - (-12) = -2$$

$$f(x) = \sin^n(x)$$

سؤال ٧

$$\lim_{x \rightarrow 0} \frac{f(x) \cdot f'(x)}{(1 - \cos x)^m}$$

$$x \rightarrow 0$$

$$m+n = ?$$

$$f(x) = \frac{\sqrt{x}+1}{\sqrt{x}-1} \Rightarrow y = \frac{\sqrt{x}+1}{\sqrt{x}-1} \Rightarrow y\sqrt{x} - y = \sqrt{x}+1 \Rightarrow \sqrt{x}y - \sqrt{x} = y+1$$

سؤال ٨

$$f^{-1}(x) \Rightarrow \sqrt{x}(y-1) = y+1 \Rightarrow \sqrt{x} = \frac{y+1}{y-1} \Rightarrow x = \left(\frac{y+1}{y-1}\right)^2 \rightarrow f^{-1}(x) = \left(\frac{n+1}{n-1}\right)^2$$

$$x = 2$$

$$f^{-1}'(x) = 2\left(\frac{x+1}{x-1}\right) \left(\frac{1(x-1) - 1(x+1)}{(x-1)^2} \right) \Big|_{x=2} = \frac{0}{0} = -12$$

⑨ J's

$$f(x) = (x^r + 1)^r (ax + 1) \leadsto \frac{f(0) - f(-1)}{0 - (-1)} = \frac{1 - (\wedge(1-a))}{1} = \wedge a - \vee = -11 \Rightarrow a = -\frac{1}{r}$$

$$[-1, 0]$$

$$-11$$

$$x = -ra$$

$$\Rightarrow f(x) = (x^r + 1)^r \left(-\frac{1}{r}x + 1\right) \Rightarrow f'(x) = r(x^r + 1)^{r-1}(-x^{\frac{r}{r}} + 1) - \frac{1}{r}(x^r + 1)^r$$

$$\Rightarrow \boxed{f'(1) = \wedge}$$

$$y = \sin x \cos^r x \Rightarrow \frac{f\left(\frac{\pi}{r}\right) - f\left(\frac{\pi}{2}\right)}{\frac{\pi}{r} - \frac{\pi}{2}} = \frac{\sin \frac{\pi}{r} \cos^r \frac{\pi}{r} - \sin \frac{\pi}{r} \cos^r \frac{\pi}{r}}{\frac{\pi}{r}} = -\frac{f}{\pi} \quad \text{① J's}$$

$$y = \sin^r x - \cos^r x$$

$$\checkmark$$

$$\underbrace{(\sin^r x + \cos^r x)}_{\text{①}} (\sin^r x - \cos^r x) = \sin^r x - \cos^r x = -\cos^r x$$

$$\Rightarrow \frac{f\left(\frac{\pi}{r}\right) - f\left(\frac{\pi}{2}\right)}{\frac{\pi}{r} - \frac{\pi}{2}} = \frac{-\cos^r \pi + \cos^r \frac{\pi}{r}}{\frac{\pi}{r}} = \frac{f}{\pi} \quad \text{②} \quad \frac{\text{①}}{\text{②}} = \frac{-\frac{f}{\pi}}{\frac{f}{\pi}} = \boxed{-1}$$