

$$g'(x) = (2 + g(x)(1 + g^2(x)) - \sqrt{x} \sin x) f'(x + g^2(x) + \sqrt{x} \cos x)$$

$$\xrightarrow{x = \frac{\pi}{4}} (2 \times 2 - 1) f'(2) = \sqrt{\pi} \rightarrow 3 f'(2) = \sqrt{\pi} \rightarrow f'(2) = \frac{\sqrt{\pi}}{3}$$

پاسخ (۲)

$$(f(x) - 2g(x))' \rightarrow f(x) = \frac{(2 + \cos x)(2 + \sin^2 x - 2 \cos x)}{(2 + \cos x)(2 - \cos x)}$$

$$\rightarrow \frac{2 + \sin^2 x - 2 \cos x - 2}{2 - \cos x} = \frac{\sin^2 x - 2 \cos x}{2 - \cos x} = -\cos x \xrightarrow{y} \sin x$$

$$\rightarrow \sin \frac{\sqrt{5}}{4} = -\frac{1}{2}$$

$$x \geq \frac{\pi}{4} \Rightarrow (x - 3)\sqrt{9x} \xrightarrow{\text{مشتق قابل}} 4\sqrt{9x} \rightarrow \varepsilon \cdot \frac{\sqrt{9x}}{4} = 2\sqrt{9x}$$

$$x < \frac{\pi}{4} \rightarrow (3 - \varepsilon x)\sqrt{9x} \xrightarrow{\text{مشتق قابل}} (-\varepsilon)\sqrt{9x} \rightarrow -\varepsilon \sqrt{9x} = -2\sqrt{9x}$$

$$2\sqrt{9x} - (-2\sqrt{9x}) = 4\sqrt{9x} = 2\sqrt{4} \rightarrow \sqrt{4} = \frac{\sqrt{4}}{4} = 2\sqrt{4} = \frac{4}{4} \rightarrow a = \frac{1}{4}$$

$$f(\varepsilon) + f'(x) = -1 \rightarrow 2 - 4a - a = -1 \rightarrow 3a = 3$$

$$y = 2 - 4x$$

$$a = \frac{3}{3} \rightarrow f'(x) = -0.4$$

$$f'(x) = -a$$

$$\frac{ax - 1}{3x + 1} = \frac{a}{3} + \frac{b}{x} \Rightarrow \frac{3ax - 1}{3x + 1} = a + \frac{b}{x}$$

$$f(x) = g(x) \text{ (تابع معادله)}$$

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$$y = \frac{a}{x} + \frac{b}{x}$$

$$3ax - 1 = 3x^2 + 14x + 5$$

$$3x^2 + (14 - 3a)x + 12 = 0 \rightarrow x + \frac{(14 - 3a)}{3}x + \varepsilon = 0$$

$$\rightarrow \frac{14 - 3a}{3} = -4 \rightarrow a = \frac{22}{3} \rightarrow \text{پاسخ}$$

$$f'(x) = 3x^2 + a \xrightarrow{12+a=0} a = -12$$

④ هم مشتق هم مقدار
با هم منفرجه

$$f(x) = x^3 - 12x - b \rightarrow 1 - 12 - b = 0 \rightarrow b = -11$$

$$-11 + 12 = 1 \rightarrow \text{جواب}$$

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$$\lim_{n \rightarrow \infty} \frac{\sin^n(n) \wedge \sin^{n-1}(n^2) \cos(n^2) 2n \sin \alpha}{(1 - \ln n)^m} \xrightarrow{1 - \ln n \sim \frac{1}{n}} \frac{2n \cdot n^{n-2} \times 1 \times 2n}{\frac{n^{2m}}{2^m}}$$

$$\rightarrow \frac{2 \cdot n \cdot 2 \times (x^{n-1})}{x^{2m}} = 2 \xrightarrow{\frac{1}{x}} \begin{cases} \varepsilon n - 1 = 2m \\ 2 \cdot n = 2 \end{cases} \rightarrow \begin{cases} n = 2 \\ m = 1/2 \end{cases}$$

و در اینجا $2m + n = 2 + 2 = 4$ جواب ✓

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$$f(x) = \frac{\sqrt{x+1}}{\sqrt{x-1}} \rightarrow f(x) = h(l(x)) \rightarrow l'(x) h'(l(x))$$

$$\rightarrow \frac{1}{2\sqrt{x}} \times \frac{-1}{(\sqrt{x-1})^2} \xrightarrow{x=4} \frac{1}{4} \times \frac{-1}{\varepsilon} = -\frac{1}{12}$$

$$f'(x) = -\frac{1}{12} \rightarrow f'(x) = -12 \leftarrow \text{مشتق } f \text{ در } x=4$$

جواب ✓

$$\begin{aligned} h(x) &= \frac{x+1}{x-1} \\ l(x) &= \sqrt{x} \\ f(2) &= 3 \\ f(4) &= 2 \\ 3 &= 4 \end{aligned}$$

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$$f(1) = 1 \quad \Delta = \frac{y_B - y_A}{x_B - x_A} = \frac{y_B - 1}{-1 - 0} = -11 \rightarrow y_B = 12$$

$$f(-1) = 12 \rightarrow (1+1)(1-a) = 1(1-a) \rightarrow 1-1a = 12 \rightarrow a = -11$$

$$f(x) = (x^2+1)^2 (1 - \frac{x}{2}) \rightarrow f'(x) = 2(x^2+1)(-x/2+1) - 1/2(x^2+1)^2$$

$$f'(1) = 2 \times 2 \times \varepsilon \times \frac{1}{2} - \varepsilon = 12 - \varepsilon = 11 \rightarrow \text{جواب}$$

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$$y = \sin \alpha \cos \alpha \left[\frac{\pi}{2}, \frac{\pi}{4} \right] \xrightarrow{\frac{\pi}{4} \rightarrow 0, \frac{\pi}{2} \rightarrow 0} \frac{-1-0}{\frac{\pi}{2}} = -\frac{1}{\frac{\pi}{2}}$$

$$y = \sin^2 \alpha - \cos^2 \alpha = -\cos 2\alpha \rightarrow \frac{\pi}{4} \rightarrow 1, \frac{\pi}{2} \rightarrow 0 \rightarrow \frac{1-0}{\frac{\pi}{2}} = \frac{1}{\frac{\pi}{2}}$$

$$\Rightarrow \frac{-\frac{1}{\frac{\pi}{2}}}{\frac{1}{\frac{\pi}{2}}} = -1 \leftarrow \text{جواب}$$

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مشتق