

نام دنام خانداس؟ صفر

$$y = x^2 + 1 \xrightarrow{\text{درجه بندی}} y = -x^2 - 1 \Rightarrow y' = -2x \Rightarrow \text{طن ساد افورد} \Rightarrow y' = -2x \quad \left. \begin{array}{l} y'(a) = -2a \\ y'(-a) = 2a \end{array} \right\}$$

سوال ۲

$$(ra) \times (-ra) = 1 \Rightarrow a^2 = \frac{1}{2} \xrightarrow{a} a = \frac{1}{\sqrt{2}} \Rightarrow y = -x^2 - 1 \Rightarrow y\left(\frac{1}{\sqrt{2}}\right) = -\frac{5}{2}$$

$$\Rightarrow \left\{ \begin{array}{l} A \left(-\frac{1}{\sqrt{2}}; \frac{5}{2}\right) \\ B \left(\frac{1}{\sqrt{2}}; -\frac{5}{2}\right) \end{array} \right. \Rightarrow \text{فاصله از مبدأ} = \frac{5}{2}$$

$\frac{1}{\sqrt{2}}$

$$a = \frac{4 + 12}{2a + 0.15} = 4$$

صاف خط

$$y = 4x - 9$$

$$\Delta = 0 \Rightarrow \frac{a}{2n-1} = 4n - 9 \Rightarrow$$

سوال ۳

$$4 = 4(2,15) + b \Rightarrow b = -9$$

$$12x^2 - 22x + 9 - a = 0 \Rightarrow \frac{\Delta'}{b'} = 0 \Rightarrow \boxed{a = -3}$$

$$f(a) = \frac{-3}{2(a)-1} = -\frac{1}{2} \quad \text{پ}$$

$$f(a) = g(a), \quad f'(a) = g'(a)$$

سوال ۴

$$r + b = \frac{1+a}{a+1} \Rightarrow b = -1$$

$$r = \frac{1-a^2}{(a+1)^2} \Rightarrow \frac{1-a}{a+1} = r \Rightarrow a = -\frac{1}{r}$$

$$\boxed{a - b = \frac{r}{\mu}} \quad \text{پ}$$

$$f(x) = 2x^2 - 3x^2 - 12x + 1 \Rightarrow f'(x) = 4x - 4x - 12 = 0 \Rightarrow x^2 - x - 2 = 0 \quad \left\{ \begin{array}{l} x = -1 \\ x = 2 \end{array} \right. \text{سوال ٤}$$

$$A(-1, 1), B(2, -19) \quad f'(x) = \frac{1}{x} A B$$

$$m_{AB} = \frac{-19 - 1}{2 + 1} = \frac{-20}{3} = -9$$

$$f'(x) = 4x^2 - 4x - 12$$

$$\Rightarrow 4x^2 - 4x - 12 = -9 \Rightarrow \boxed{\text{محل درجه دوم}} \quad \text{پ}$$

$$\text{سوال ٥} \quad \text{نقطه عطف تابع } y = kx^3 + (k+1)x^2 \text{ در ربع دوم است} \Rightarrow y' = 3kx^2 + 2(k+1)x \Rightarrow y'' = 6kx + 2(k+1) = 0$$

$$4kx + 2k + 2 = 0 \Rightarrow x = \frac{-k-1}{2k} < 0 \Rightarrow \begin{cases} k > 0 \\ k < -1 \end{cases} \quad \text{I} \quad \text{< طول نقطه عطف}$$

٦٥

$$k \left(\frac{-k-1}{2k} \right)^3 + (k+1) \left(\frac{-k-1}{2k} \right)^2 > 0 \quad f \left(\frac{-k-1}{2k} \right) > 0 \quad \text{عرض نقطه عطف}$$

$$\Rightarrow \frac{-(k+1)^3}{4k^2} + \frac{(k+1)^2}{2k} > 0 \Rightarrow \frac{-(k+1)^3 + 2(k+1)^2}{4k^2} > 0 \Rightarrow \frac{2(k+1)^2}{4k^2} > 0$$

$$\Rightarrow 2(k+1)^2 > 0 \Rightarrow (k+1)^2 > 0 \Rightarrow k+1 > 0 \Rightarrow k > -1 \quad \text{II}$$

$$\text{I} \cap \text{II} \quad \boxed{k > 0}$$

سوال 1

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

x	$-\sqrt{2}$	0	$\sqrt{2}$
y'	$- \downarrow +$	0	$- \downarrow +$
	\downarrow	\uparrow	\downarrow
	\uparrow		\uparrow
	min		min

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

$$m_{AB} = \frac{-2 + 2}{\sqrt{2} + \sqrt{2}} = 0$$

$$m_{CD} = \frac{0 - 0}{1 + 1} = 0$$

$$f''(x) = 12x^2 - 8 = 12(x^2 - \frac{2}{3})$$

x	$-\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$
y''	$+ \downarrow$	$- \downarrow$
	\cup	\cap
	محدب	محدب

C $(-1, 0)$
 D $(1, 0)$

سید محمد حسنین = حوازی = زیاد حسنین

$$\lim_{n \rightarrow 0^+} \frac{f(n)}{n} = 0 \rightarrow \lim_{n \rightarrow 0^+} \frac{\cos^3(xn) + an^2 + b}{n} = 0 \rightarrow \lim_{n \rightarrow 0^+} \frac{1+b}{n} = 0 \quad -1$$

$$\hookrightarrow \boxed{b = -1}$$

$$\lim_{n \rightarrow 0^-} \frac{f'(n)}{n} = 2 = \lim_{n \rightarrow 0^-} \frac{-4 \sin(xn) \cos^2(xn) + 2an}{n} = 2 \quad \text{هم‌ارزی}$$

$$\lim_{n \rightarrow 0^-} \frac{(-4 \times 2n) + 2an}{n} = 2 \rightarrow 2a - 12 = 2 \rightarrow 2a = 14 \rightarrow \boxed{a = 7}$$

$$a + b = 7 - 1 = 6$$

-2 نقاط! $(\alpha, \alpha^2 - 1)$ و $(-\alpha, \alpha^2 - 1)$ را در نظر بگیریم

$$f(n) = x^2 - 1 \rightarrow f'(n) = 2x$$

$$f'(\alpha) \times f'(-\alpha) = -1 \rightarrow 2\alpha \times (-2\alpha) = -1 \rightarrow \alpha^2 = \frac{1}{2}$$

$$\hookrightarrow \alpha = \pm \frac{1}{\sqrt{2}} \rightarrow f\left(\frac{1}{\sqrt{2}}\right) + f\left(-\frac{1}{\sqrt{2}}\right) = \frac{1}{2} - 1 + \frac{1}{2} - 1 = -2 \quad (a = 1, 5)$$

$$f(n) = g(n) \rightarrow \sin n + \frac{1}{\sqrt{2}} \cos n = \frac{\sqrt{2}}{2} \sin n \rightarrow \sin n = \cos n \quad \begin{matrix} \leftarrow n \leq \pi \\ \leftarrow n \geq \pi \end{matrix} \quad -3$$

$$\boxed{n = \frac{\pi}{2}}$$

$$f\left(\frac{\pi}{2}\right) = \sin \frac{\pi}{2} + \frac{1}{\sqrt{2}} \cos \frac{\pi}{2} = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \frac{2\sqrt{2}}{2}$$

$$f(n) = \cos n - \frac{1}{\sqrt{2}} \sin n \rightarrow f'\left(\frac{\pi}{2}\right) = -\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} = -\frac{\sqrt{2}}{2}$$

$$\text{مقادیر } y \rightarrow y - \frac{2\sqrt{2}}{2} = \frac{\sqrt{2}}{2} \left(x - \frac{\pi}{2}\right) \quad y = 0 \rightarrow \frac{\sqrt{2}}{2} \left(x - \frac{\pi}{2}\right) = -\frac{2\sqrt{2}}{2} \rightarrow \boxed{x = \frac{\pi}{2} - 3}$$

$$y' = 3kn^2 + 2(k+1)n \rightarrow y'' = 6kn + 2(k+1) = 0 \rightarrow n = \frac{k+1}{-3k} \quad \checkmark$$

$$\frac{-(k+1)}{3k} < 0 \rightarrow \frac{-1}{-1+k} > 0 \rightarrow \boxed{k < -1} \cup \boxed{k > 0} \quad \leftarrow \text{نقطه‌ای عمیق در ضمیمه دوم است پس}$$

$$\frac{-(k+1)}{3k} (k) + (k+1) > 0 \rightarrow \frac{-(k+1)}{3} + k+1 > 0 \rightarrow \frac{2k+2}{3} > 0 \rightarrow \boxed{k > -1}$$

$1 \cap 2 \rightarrow k > 0$
 بنابراین از این هم مقدار k منفرجه صحیح جواب ندارد!

$$f'(x) = -\frac{b}{\mu a} = -\frac{a}{\mu} \rightarrow x = -\frac{a}{\mu} \rightarrow \frac{-a}{\mu} = -1 \rightarrow a = \mu$$

$$f(-1) = -2 \rightarrow -1 + \mu - b - 1 = -2 \rightarrow b = \mu - 2$$

$$\left. \begin{array}{l} \\ \end{array} \right\} \frac{a}{b} = \frac{\mu}{\mu - 2}$$

$$f(\cdot) = \tau \rightarrow c = \tau$$

$$f'(n) = 0 \rightarrow \mu n^2 + \tau n + b = 0 \rightarrow b = 0$$

$$f'(n) = \mu n^2 + \tau n \rightarrow n(\mu n + \tau) = 0 \rightarrow n = 0$$

$$\hookrightarrow n = -\frac{\tau}{\mu}$$

$$f\left(-\frac{\tau}{\mu}\right) = 0 \rightarrow \frac{-\tau a^{\mu}}{\mu} + \frac{\tau a^{\mu}}{\mu} + \tau = 0 \rightarrow a^{\mu} = -\tau \mu \rightarrow a = -\tau$$

$$n = -\frac{\tau}{\mu} = -\frac{\tau(-\tau)}{\tau} = \tau$$

x			$-\frac{\tau a}{\mu}$
y'	+	-	+
y	↑	↓	↑
			min

9