

1) (الف) درست (ب) نادرست (ج) نادرست (د) درست (ه) نادرست

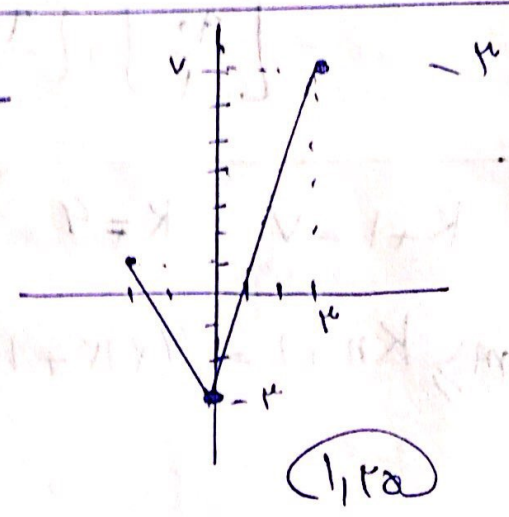
$x = -1$ $1 - k - 1 = 1$ $k = -1$ (الف) (ک)

$2(-1) + 1(1) = 1$ (ب) $\log x$ (ب)

$x = -\frac{b}{2a} = \frac{1}{2} = 1$ (د)

x	0	1	2
g	1	-1	0

x	1	0	-1
g	1	-1	1

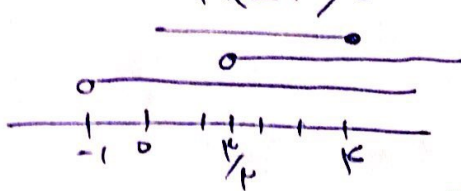


$2 - x = 0$ $x = 2$
 $1 - x = 1$ $x = 0$
 $2 - x = 0$ $x = 2$

$2(2) + 1 = 1$
 $2(-2) + 1 = -1$
 $2(0) + 1 = 1$

$D_g = [-1, 2]$

$\log(x+1) \leq \log(2x-1)$ $x+1 > 0$ $x > -1$ (ک)
 $x+1 \leq 2x-1$ $2x-1 > 0$ $x > \frac{1}{2}$



$[\frac{1}{2}, 1]$ ج. ر

$g = 2 + k \cdot \sin x$

$2+1=3$ Max
 $2-1=1$ Min

(الف) (د)

ب) $2 \sin^2 x = \sqrt{2}$

$\sin^2 x = \frac{\sqrt{2}}{2}$ $\alpha = \frac{\pi}{4}$

$\begin{cases} 2x = 2k\pi + \frac{\pi}{4} \\ 2x = 2k\pi + \pi - \frac{\pi}{4} \end{cases}$

$\begin{cases} x = \frac{2k\pi}{2} + \frac{\pi}{8} \\ x = \frac{2k\pi}{2} + \frac{\pi}{4} \end{cases}$

(د) (ک)

$$\lim_{n \rightarrow \frac{\pi}{2}^+} \frac{n+1}{\tan n} = \frac{\frac{\pi}{2}+1}{0^-} = -\infty \quad -9$$

$$\lim_{n \rightarrow \frac{\pi}{2}^-} \frac{n+1}{\tan n} = \frac{\frac{\pi}{2}+1}{0^+} = +\infty \quad (1/5)$$

$$\lim_{n \rightarrow \pm\infty} \frac{n^2}{n^2} = 0 \quad (1/5)$$

$$f(n) = \frac{n^2 + n}{n^2 - n}$$

$n^2 - n = 0 \Rightarrow n = 0 \times$
 $n(n-1) = 0 \Rightarrow n = 1 \checkmark$

معادلات باقیمانده

$$\lim_{n \rightarrow \pm\infty} \frac{n^2}{n^2} = 1 \quad j=1 \quad \text{معادلات باقیمانده} \quad (1/5)$$

$$n^2 + bn + c = 0$$

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$a = -1$

$$(n+1)^2 = 0 \Rightarrow n^2 + 2n + 1 = 0 \Rightarrow b = 2$$

$$n^2 + bn + c = 0 \Rightarrow c = 1 \quad (1/5)$$

$$f'(r) = \lim_{n \rightarrow r} \frac{f(n) - f(r)}{n - r} = \lim_{n \rightarrow r} \frac{|n-r| - 0}{n-r} \quad -9$$

$$= \begin{cases} \lim_{n \rightarrow r^+} \frac{n-r}{n-r} = 1 \\ \lim_{n \rightarrow r^-} \frac{-(n-r)}{n-r} = -1 \end{cases} \quad -1 \neq 1 \quad \text{مشتق یونیفرسیت} \quad (1)$$

$$\lim_{n \rightarrow a} f(n) = f(a) \quad \text{شرط پیوستگی}$$

$$\lim_{n \rightarrow a} f(n) - f(a) = 0 \Rightarrow \lim_{n \rightarrow a} \frac{f(n) - f(a)}{n-a} \times (n-a)$$

$$= f'(a) \times (a-a) = 0$$

$$\lim_{x \rightarrow a} h - f(x) - f(a) = 0 \Rightarrow \lim_{x \rightarrow a} h - f(x) = f(a) \quad (1/20)$$

$$\text{ج) } f'(x) = f'(2x^2 + \sqrt{x-1}) \left(4x^2 + \frac{1}{2\sqrt{x-1}} \right) \quad (1/20) \quad (11)$$

$$\text{د) } g'(x) = \frac{1(x^2+1) - 2x(x)}{(x^2+1)^2} \times \left(-\sin\left(\frac{x}{x^2+1}\right) \right) \quad (0/5)$$

$$\text{ه) } f'(x) = \frac{2}{2\sqrt{2x+2}} \times (x^2+1) + 2x^2(\sqrt{2x+2}) \quad (2/20)$$

$$\text{معدل التغير} = \frac{f(a) - f(0)}{a - 0} = \frac{(2a - a + 1) - 1}{a} = \frac{a}{a} = 1 \quad (1/20)$$

$$f'(t) = 2t - 1 \quad 2t - 1 = 1 \quad 2t = 2 \quad t = \frac{2}{2} \quad (1/20)$$

$$\text{Max}(1, 2) \rightarrow \begin{cases} x=1 \\ y=2 \end{cases} \quad \begin{cases} -1 + a + b = 2 & a + b = 3 \end{cases} \quad (1/20)$$

$$\rightarrow \begin{cases} x=1 \\ y=0 \end{cases} \quad \begin{cases} y' = -2x^2 + a \\ -2 + a = 0 & a = 2 & b = 1 \end{cases} \quad (1/20)$$

$$f(x) = \sqrt{x^2 - 2x + 2} \quad [0, 2] \quad (1/20)$$

$$f' = \frac{2x - 2}{2\sqrt{x^2 - 2x + 2}} \quad 2x - 2 = 0 \quad x = \frac{2}{2} = 1 \quad \checkmark$$

$$x^2 - 2x + 2 = 0 \quad \Delta = 4 - 4(1)(2) < 0 \rightarrow \text{لا شيء}$$

x	0	1	2
f	2	$\sqrt{2}$	2
	Max	Min	Max
	2	$\sqrt{2}$	2

$$\sqrt{1 - 2 + 2} = \sqrt{1}$$

$$\sqrt{4 - 4 + 2} = \sqrt{2}$$

(1/20)

$$f(x) = \frac{2x}{x-1}$$

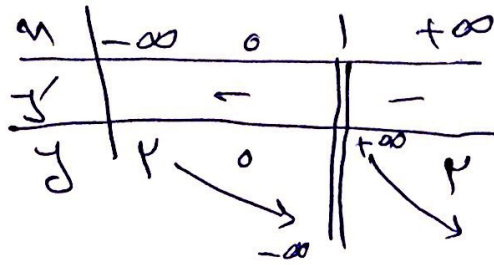
$$\lim_{x \rightarrow \pm\infty} \frac{2x}{x} = 2$$

$$x-1=0 \rightarrow x=1$$

$$x=0 \rightarrow y=0$$

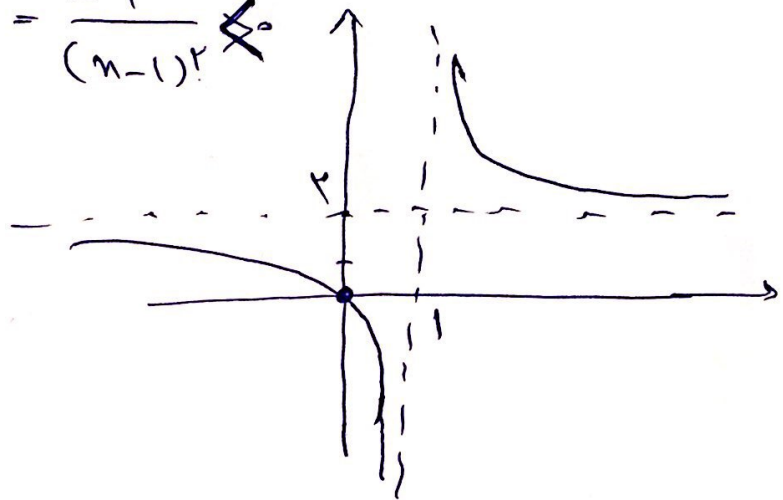
$$f'(x) = \frac{2(x-1) - 1(2x)}{(x-1)^2} = \frac{-1}{(x-1)^2}$$

(1, 0)



(13)

x	$\pm\infty$	1	$\pm\infty$
y	2	$\pm\infty$	0



$$y = x^3 + 3x^2 + 1$$

$$y' = 3x^2 + 6x$$

$$y'' = 6x + 6 = 0$$

$$x = -1$$

$$y = -1 + 1 + 1 = 1$$

(14)

x	-1
y''	$-$ $+$
y	\cap \cup

نقطه عطف (3 و -1)

تفقر و به چپین (-infinity و -1)

(-1, +infinity) لا = 2