

۱۹،۵ آفرین به شما

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الف) $\lim_{x \rightarrow 2^+} \frac{x+5}{x+1} \rightarrow \frac{2(2)+5}{(2)+1} = 3$

ب) $\lim_{x \rightarrow 2^-} \frac{x+5}{x+1} \rightarrow \frac{2(2)+5}{(2)+1} = 3$

ج) $\lim_{x \rightarrow 2} \frac{x+5}{x+1} \rightarrow 3$

د) $\lim_{x \rightarrow 0} \frac{x+7}{[x]}$
 $\rightarrow \frac{2(0)+7}{[(0)]} = 7$
 $\rightarrow \frac{2(0)+7}{[(0)]} = 7$

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الف) $\lim_{x \rightarrow 3^-} f(x) - 2 \rightarrow f(3^-) - 2 = f(3) - 2 = 6$

ب) $\lim_{x \rightarrow 3^-} [f(x) - 2] \rightarrow [f(3^-) - 2] = [11 - 2] = 9$

ج) $\lim_{x \rightarrow 3^-} [f(x) - 2] = [10] = 10$

د) $\lim_{x \rightarrow 3^+} [f(x) - 2] = [10] = 10$

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الف) $\lim_{x \rightarrow 5^-} \frac{f(x)+1}{2} = \frac{f(5^-)+1}{2} = \frac{f(5)+1}{2} = \frac{7}{2}$

ب) $\lim_{x \rightarrow 5^-} \left[\frac{f(x)+1}{2} \right] \Rightarrow \left[\frac{f(5^-)+1}{2} \right] \Rightarrow [5] = 5$

ج) $\lim_{x \rightarrow 5^-} \left[\frac{f(x)+1}{2} \right] = [5] = 5$

د) $\lim_{x \rightarrow 5^+} \left[\frac{f(x)+1}{2} \right] = [5] = 5$

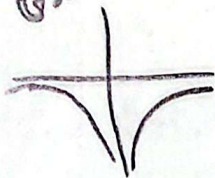
$$a) \lim_{x \rightarrow 1} \frac{(x-2)}{(x-1)(x-0)} = \lim_{x \rightarrow 1} \frac{1}{x-1} \begin{matrix} \nearrow \frac{1}{0^+} = +\infty \\ \searrow \frac{1}{0^-} = -\infty \end{matrix}$$

$$b) \lim_{x \rightarrow 3} \frac{(x-2)}{(x-3)^2} = \frac{-1}{(x-3)^2} = \frac{-1}{0^+} = -\infty$$

$\frac{+}{+} = +$

$$a) \lim_{x \rightarrow -1} [-x^3] - [\Delta x] \begin{matrix} \xrightarrow{-1^+} [-(-1^3)] - [\Delta(-1)] = 1 - (-10) = 11 \\ \xrightarrow{-1^-} [-(-1^3)] - [\Delta(-1)] = 1 - (-4) = 5 \end{matrix}$$

$$b) \lim_{x \rightarrow (-\frac{1}{2})^-} \left[\frac{-1}{x^2} \right] = \left[\frac{-1}{(-\frac{1}{2})^2} \right] = \left[-4 \right] = -4$$



$$a) \lim_{x \rightarrow 1} [x^3 - x^2] + 3 \begin{matrix} \xrightarrow{1^+} [(1^3 - 1^2)] + 3 = [0] + 3 = 3 \\ \xrightarrow{1^-} [(1^3 - 1^2)] + 3 = [0] + 3 = 3 \end{matrix}$$

$$f(x) = x^3 - x^2$$

$$x^3(1-x) \begin{matrix} \xrightarrow{1^+} \text{تقارب} \\ \xrightarrow{1^-} \text{تقارب} \end{matrix}$$

$$b) \lim_{x \rightarrow 0} [x^3 - x^2] + 3 \begin{matrix} \xrightarrow{0^+} [0^3 - 0^2] + 3 = 3 \\ \xrightarrow{0^-} [0^3 - 0^2] + 3 = 3 \end{matrix}$$

$$f(x) = x^3 - x^2$$

$$x^3(1-x) \begin{matrix} \xrightarrow{0^+} \text{تقارب} \\ \xrightarrow{0^-} \text{تقارب} \end{matrix}$$

$$a) \lim_{n \rightarrow \infty} \frac{n^2 - 1}{n^2 + 2} = \frac{(n-1)(n+1)}{(n-1)(n+2)} \begin{matrix} \xrightarrow{+\infty} \frac{n^2}{n^2} = 1 \\ \xrightarrow{-\infty} \frac{n^2}{n^2} = 1 \end{matrix}$$

$$b) \lim_{n \rightarrow \infty} \frac{\sin n}{n \sin n} \begin{matrix} \xrightarrow{+\infty} \frac{-1/n}{n \sin n} = -\frac{1}{n^2 \sin n} \\ \xrightarrow{-\infty} \frac{1/n}{n \sin n} = \frac{1}{n^2 \sin n} \end{matrix}$$

نوع اولی

الف) $\lim_{x \rightarrow \frac{\pi}{2}^+} \sqrt{\cos x} \rightarrow \cos x > 0 \rightarrow \sqrt{0^+} = 0$
 $\lim_{x \rightarrow \frac{\pi}{2}^-} \sqrt{\cos x} \rightarrow \cos x < 0 \rightarrow \sqrt{0^-} = 0$

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ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} \Rightarrow \sqrt{\sqrt{x}(\sqrt{x} - 2)}$
 $\sqrt{x} = t, t > 0 \rightarrow \sqrt{t(t-2)}$
 $\lim_{t \rightarrow 0} \sqrt{t(t-2)} = \sqrt{0 \cdot (-2)} = 0$
 (در حساب میزنیم) $\rightarrow$ جواب و راست $\rightarrow$ تعریف نمی شود
 ندارد

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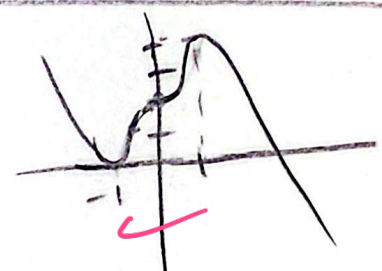
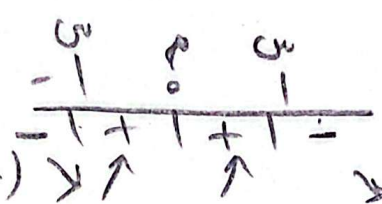
الف) $\lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^2(x-1)} = \frac{(-1)^{\lfloor 0^+ \rfloor}}{0^-} = \frac{1}{0^-} = -\infty$
 $\lim_{x \rightarrow 0^-} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^2(x-1)} = \frac{(-1)^{\lfloor 0^- \rfloor}}{0^-} = \frac{-1}{0^-} = +\infty$

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ب) $\lim_{x \rightarrow 2} \frac{x^2 \lfloor x \rfloor}{x - \lfloor x \rfloor}$
 $\lim_{x \rightarrow 2^+} \frac{x^2 \lfloor x \rfloor}{x - \lfloor x \rfloor} = \frac{4 \cdot 2}{2 - 2} = \frac{8}{0} = +\infty$
 $\lim_{x \rightarrow 2^-} \frac{x^2 \lfloor x \rfloor}{x - \lfloor x \rfloor} = \frac{4 \cdot 1}{2 - 1} = \frac{4}{1} = 4$

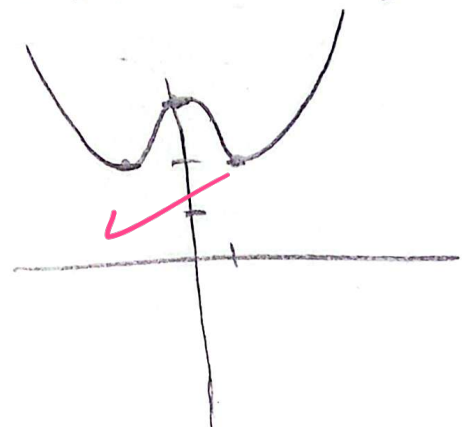
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الف) $y = 2x^3 - 3x^2 + 2$
 $y' = 6x^2 - 6x$
 $y' = 6x^2(1+x)(1-x)$



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ب) $y = x^3 - 2x^2 + 2$
 $y' = 3x^2 - 4x$
 $y' = x(3x - 4)$
 $x = 0, x = \frac{4}{3}$



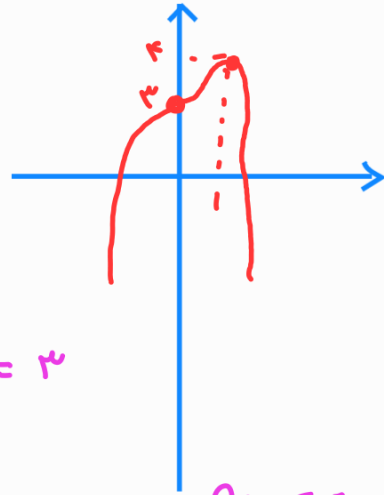
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نمودار دینی - تکالیف ۱۸

$$y = [\epsilon n^r - r n^2 + r] \rightarrow y' = 1r n^r - 1r n^2 \rightarrow y' = 0 \rightarrow 1r n^r (1-n) = 0 \quad -4$$

$n = 0, n = 1$

	*		
	.		
			1
y'	-	-	+
y	↘	↘	↗



$$\text{اذا) } \lim_{n \rightarrow 1} [\epsilon n^r - r n^2 + r] = [\epsilon^-] = r$$

$$\text{ب) } \lim_{n \rightarrow 0} [\epsilon n^r - r n^2 + r] = \begin{cases} \rightarrow n > 0 \rightarrow \lim[y] = [\epsilon^+] = r \\ \rightarrow n < 0 \rightarrow \lim[y] = [\epsilon^-] = r \end{cases}$$