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فاطمه سلطان کلبی

الف) $\lim_{n \rightarrow 2^+} \frac{2n+5}{n+1} \xrightarrow{n=2.1} \frac{9.1}{3.1} = 2.9 \approx 3 \Rightarrow \lim_{n \rightarrow 2^+} \frac{2n+5}{n+1} = 3$ ✓

①

ب) $\lim_{n \rightarrow 2^-} \frac{2n+5}{n+1} \xrightarrow{n=1.9} \frac{3.9}{2.9} \approx 3 \Rightarrow \lim_{n \rightarrow 2^-} \frac{2n+5}{n+1} = 3$ ✓

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ج) $\lim_{n \rightarrow 2} \frac{2n+5}{n+1} \Rightarrow \frac{2+5}{2} = \frac{7}{2} = 3.5$ ✓
 ؟ چرا همین عدد و نیاز به چپ و راست نداریم.

از این خارج مخرج مطلق می شود

د) $\lim_{n \rightarrow \infty} \frac{2n+5}{[n^2]}$
 ؟ چطور می توانیم؟
 $\frac{0}{0} \Rightarrow \frac{2}{0} = +\infty$
 $\frac{0}{0} \Rightarrow \frac{2}{0} = +\infty$
 حد ندارد
 مقدار حد مشخص نیست!

تعریف نشده

الف) $\lim_{n \rightarrow 3} 4[n] - 2 \Rightarrow [3^-] = 2 \Rightarrow \lim_{n \rightarrow 3} 4[n] - 2 = 6$ ✓

②

ب) $\lim_{n \rightarrow 3^-} [4n - 2] \Rightarrow \lim_{n \rightarrow 3^-} [12^-] - 2 = 9$ ✓

ج) $\lim_{n \rightarrow 3^-} [4n - 2] = 10$ ✓

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د) $\lim_{n \rightarrow 3^+} [4n - 2] = 11$ ✓

$$\text{الف) } \lim_{n \rightarrow \infty} \frac{\sqrt[n]{n} + 1}{2} = \frac{1}{2} \quad \checkmark \quad \rightarrow \lim_{n \rightarrow \infty} \left(\frac{\sqrt[n]{n} + 1}{2} \right) = \frac{1}{2} \quad \checkmark$$

$$\text{ب) } \left(\lim_{n \rightarrow \infty} \frac{\sqrt[n]{n} + 1}{2} \right) = \frac{1}{2} \quad \checkmark \quad \rightarrow \left(\lim_{n \rightarrow \infty} \frac{\sqrt[n]{n} + 1}{2} \right) = \frac{1}{2} \quad \checkmark$$

$b^+ \Rightarrow \lim b^+ = \frac{1}{2}$ $b^- \Rightarrow \lim b^- = \frac{1}{2}$

$$\text{الف) } \lim_{n \rightarrow 1} \frac{n-1}{n^2-4n+4} \rightarrow \text{قسمة صفرية} \Rightarrow \begin{matrix} + \\ - \end{matrix} \frac{1}{0^-} = +\infty, \begin{matrix} + \\ - \end{matrix} \frac{1}{0^+} = -\infty$$

$\hookrightarrow (n-1)(n-2) \Rightarrow \frac{1}{+1-1+}$

$$\rightarrow \lim_{n \rightarrow 2} \frac{n-2}{n^2-4n+4} \rightarrow \begin{matrix} + \\ - \end{matrix} \frac{0}{0} \Rightarrow \begin{matrix} + \\ - \end{matrix} \frac{1}{0^+} = +\infty, \begin{matrix} + \\ - \end{matrix} \frac{1}{0^-} = -\infty$$

$\hookrightarrow (n-2)^2 \Rightarrow \frac{1}{+1+}$

$$\text{الف) } \lim_{n \rightarrow 3} [-3n] - [15n] \rightarrow \text{دائري بولت} \Rightarrow \begin{matrix} + \\ - \end{matrix} \begin{matrix} [9] \\ [15] \end{matrix} = 9-15 = -6, \begin{matrix} + \\ - \end{matrix} \begin{matrix} [9] \\ [15] \end{matrix} = 9+15 = 24$$

$\hookrightarrow (n-3)^2 \Rightarrow \frac{1}{+1+}$

$$\text{ب) } \lim_{n \rightarrow (-\frac{1}{4})^-} \left(\frac{-1}{n^4} \right) = \lim_{n \rightarrow (-\frac{1}{4})^-} \left(\frac{-1}{\frac{1}{16}} \right) \Rightarrow \lim_{n \rightarrow (-\frac{1}{4})^-} [-16] = -16$$

$\lim_{n \rightarrow (-\frac{1}{4})^-} \left(\frac{-1}{n^4} \right) = -16$

$2x < -\frac{1}{4} \rightarrow x < -\frac{1}{8} \rightarrow -x > \frac{1}{8} \rightarrow -\frac{1}{x} > 8$

$$\text{الف) } \lim_{n \rightarrow 1} \left[\sqrt[n]{n} - \sqrt[n]{n} + \sqrt[n]{n} \right] = 1$$

$$\hookrightarrow \sqrt[n]{n} - \sqrt[n]{n} + \sqrt[n]{n} \rightarrow \begin{matrix} + \\ - \end{matrix} \frac{1}{0^+} = +\infty, \begin{matrix} + \\ - \end{matrix} \frac{1}{0^-} = -\infty$$

$\hookrightarrow \sqrt[n]{n} - \sqrt[n]{n} + \sqrt[n]{n} = 1$

$$\text{ب) } \lim_{n \rightarrow 1} \left[\sqrt[n]{n} - \sqrt[n]{n} + \sqrt[n]{n} \right] = 1$$

$\hookrightarrow \sqrt[n]{n} - \sqrt[n]{n} + \sqrt[n]{n} = 1$

الف) $\lim_{n \rightarrow 2} \frac{n^3 - 1}{n^2 - 2}$ $\Rightarrow$ $\frac{0}{0}$ $\Rightarrow$ $\frac{(n-1)(n^2+n+1)}{(n-2)(n+2)}$ (V)

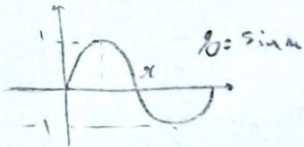
$\Rightarrow \lim_{n \rightarrow 2^+} \frac{n^3 - 1}{n^2 - 2} = \frac{7}{2} = 3.5$

$\Rightarrow \lim_{n \rightarrow 2^-} \frac{n^3 - 1}{n^2 - 2} = \frac{7}{2} = 3.5$

خروجی ها یکی است! (نتیجه ای)

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ب) $\lim_{n \rightarrow \pi} \frac{|\sin n|}{\sin n}$

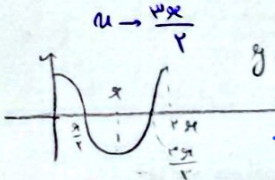


$\Rightarrow \lim_{n \rightarrow \pi^+} \frac{|\sin n|}{\sin n} = \frac{-1}{-1} = 1$

$\Rightarrow \lim_{n \rightarrow \pi^-} \frac{|\sin n|}{\sin n} = \frac{-1}{1} = -1$

خروجی ها یکی است!

الف) $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{c \cdot \sin n}$



$\Rightarrow \lim_{n \rightarrow \frac{\pi}{2}^+} \sqrt{c \cdot \sin n} = 0$

$\Rightarrow \lim_{n \rightarrow \frac{\pi}{2}^-} \sqrt{c \cdot \sin n} = 0$

داده: $a = 0, a < t < \infty \rightarrow (I) \cap (II)$ همه تابع در نقاط اطراف مغز تعریف نمی شود.

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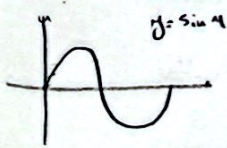
ب) $\lim_{n \rightarrow 0} \sqrt{n - 2\sqrt{n}}$

$\Rightarrow \lim_{n \rightarrow 0^+} \sqrt{n - 2\sqrt{n}} = 0$

$\Rightarrow \lim_{n \rightarrow 0^-} \sqrt{n - 2\sqrt{n}} = \text{تعیین نمی شود}$

$\lim_{n \rightarrow 0} \sqrt{n - 2\sqrt{n}} = \text{تعریف نشده}$

الف) $\lim_{n \rightarrow +\infty} \frac{(-1)^{[\sin n]} \cdot [\sin n]}{n^3 - n^2}$



$\Rightarrow \lim_{n \rightarrow +\infty} \frac{(-1)^{[\sin n]} \cdot [\sin n]}{n^3 - n^2} = \frac{1}{0^+} = -\infty$

2

9

ب) $\lim_{n \rightarrow 2} \frac{n^2 - [n^2]}{n - [n]}$

$\Rightarrow \lim_{n \rightarrow 2^+} \frac{n^2 - [n^2]}{n - [n]} = \frac{(2-1)(2+1)}{2-1} = \lim_{n \rightarrow 2^+} (n+1) = 3$

$\Rightarrow \lim_{n \rightarrow 2^-} \frac{n^2 - [n^2]}{n - [n]} = \frac{1}{1} = 1$

دایره به دست خودم

خروجی ها یکی است!

$$a) y = \frac{1}{2}u^2 - \frac{1}{2}u + \frac{1}{2}$$

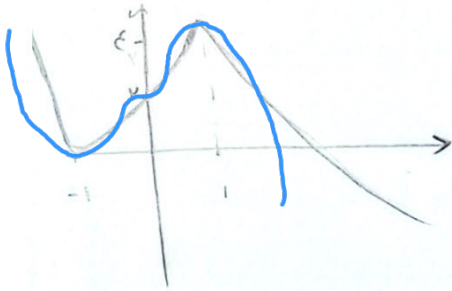
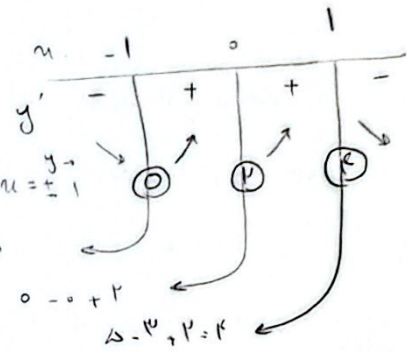
$$h.p \rightarrow \frac{1}{2}u^2 - \frac{1}{2}u \rightarrow -\frac{1}{2}u + \frac{1}{2}u^2 = .$$

$$\frac{1}{2}u^2(-u+1) = .$$

$$-u+1 = .$$

$$+u^2 = +1 \Rightarrow u = \pm 1$$

$$-\frac{1}{2} + \frac{1}{2}, \frac{1}{2} = 0$$

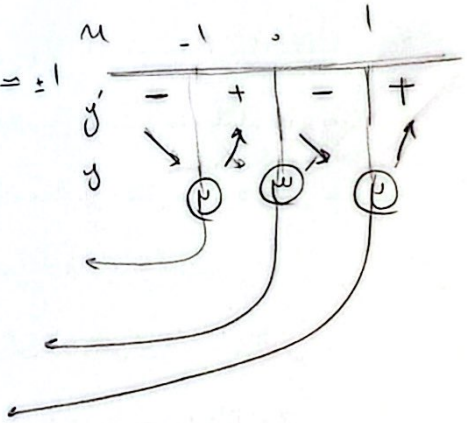


$$\rightarrow y = u^2 - \frac{1}{2}u + \frac{1}{2}$$

$$h.p \rightarrow \frac{1}{2}u^2 - \frac{1}{2}u \rightarrow \frac{1}{2}u^2 - \frac{1}{2}u = .$$

$$\frac{1}{2}u^2(u-1) = .$$

$$u^2 = 1 \Rightarrow u = \pm 1$$



$$1 - \frac{1}{2}u = \frac{1}{2}$$

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

$$1 - \frac{1}{2}u = \frac{1}{2}$$

