

بکتاب (نقش) / دایره (نقش) /

برای

۱۹, ۲۵

تکلیف ۱۱

$$۱) \lim_{x \rightarrow 2} \frac{2x+5}{x+1} \xrightarrow{x=2} \frac{2+5}{2} = \frac{7}{2} = 3.5 \rightarrow 3.5 \checkmark$$

$$۲) \lim_{x \rightarrow 2} \frac{2x+5}{x+1} \xrightarrow{x=2} \frac{2+5}{2} = \frac{7}{2} = 3.5 \rightarrow 3.5 \checkmark$$

$$۳) \lim_{x \rightarrow 2} \frac{2x+5}{x+1} \xrightarrow{x=2} \frac{2+5}{2} = \frac{7}{2} = 3.5 \rightarrow 3.5 \checkmark$$

$$۴) \lim_{x \rightarrow 0} \frac{2x+5}{x^2} \xrightarrow{x=0^+} \frac{2x+5}{0} \rightarrow \infty \xrightarrow{x=0^-} \frac{2x+5}{0} \rightarrow -\infty \rightarrow \infty \checkmark$$

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الف) $\lim_{x \rightarrow 2^-} \{x\} \rightarrow \{2^- \} = \{2\} - 1 = 1$ ✓

ب) $\lim_{x \rightarrow 2^-} [x] \rightarrow [2^-] = [1.999] = 1$ ✓

ج) $\lim_{x \rightarrow 2^-} \{x-1\} \rightarrow \{2-1\} = \{1\} = 0$ ✓

د) $\lim_{x \rightarrow 2^+} \{x-1\} \rightarrow \{2-1\} = \{1\} = 0$ ✓

الف) $\lim_{x \rightarrow 2^-} \frac{\{x\}+1}{x} \rightarrow \lim_{x \rightarrow 2^-} \frac{\{2^- \}+1}{2} \rightarrow \lim_{x \rightarrow 2^-} \frac{2}{2} = 1$ ✓

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

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

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

الف) $\lim_{x \rightarrow 1} \frac{x-1}{x^2-4x+3} = \frac{x-1}{(x-1)(x-3)} \xrightarrow{\text{تقسیم کنیم}} \frac{1}{x-3}$ ✓

ب) $\lim_{x \rightarrow 1^+} \frac{x-1}{x^2-4x+3} = \frac{1-1}{1-4+3} = \frac{0}{0} = 0$ ✓

ج) $\lim_{x \rightarrow 1^-} \frac{x-1}{x^2-4x+3} = \frac{1-1}{1-4+3} = \frac{0}{0} = 0$ ✓

د) $\lim_{x \rightarrow 1^+} \frac{x-1}{x^2-4x+3} = \frac{1-1}{1-4+3} = \frac{0}{0} = 0$ ✓

ه) $\lim_{x \rightarrow 1^-} \frac{x-1}{x^2-4x+3} = \frac{1-1}{1-4+3} = \frac{0}{0} = 0$ ✓

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$$a) \lim_{x \rightarrow -2} [-3x] - [5x]$$

$$\begin{aligned} &\rightarrow -2^+ \rightarrow [9^-] - [10^+] = 1 - (-1) = 2 \\ &\rightarrow -2^- \rightarrow [7^+] - [10^-] = 9 - (-1) = 10 \end{aligned}$$

بعض ملاحظات

$$\lim_{x \rightarrow (-1)^-} \left[-\frac{1}{x^2}\right] \rightarrow -\frac{1}{x} > x \xrightarrow{\text{ملاحظة}} -2 < -\frac{1}{x} \rightarrow 14 > \frac{1}{x^2}$$

$$x=1 \rightarrow -14 < \frac{1}{x^2} \rightarrow \lim_{x \rightarrow (-1)^-} \left[-\frac{1}{x^2}\right] = -14$$

$$b) \lim_{x \rightarrow 1} [x^2 - 5x^2 + 5] \xrightarrow{\text{ملاحظة}} -15x^2 + 15x^2 = 0$$

$$\rightarrow -15x^2(x-1) \xrightarrow{\text{ملاحظة}} \begin{array}{c|ccc} x & -\infty & 0 & +\infty \\ y & + & 0 & - \end{array} \rightarrow x=1 \rightarrow \varepsilon - x^2 + 5 \geq \varepsilon$$

$$\rightarrow x=0 \rightarrow 0 + 5 = 5$$

$$\lim_{x \rightarrow 0} [5x^2 - 4x^2 + 5] \xrightarrow{\text{ملاحظة}} -15x^2 + 15x^2 = 0$$

$$\rightarrow -15x^2(x-1) \xrightarrow{\text{ملاحظة}} \begin{array}{c|ccc} x & -\infty & 0 & +\infty \\ y & + & 0 & - \end{array}$$

$$\begin{aligned} &\rightarrow 0^+ \rightarrow [5^+] = 5 \\ &\rightarrow 0^- \rightarrow [5^-] = 5 \end{aligned}$$

$$\lim_{x \rightarrow 2} \frac{|9x^2 - 1|}{x^2 - 2} \xrightarrow{x=2} \frac{0}{0} \xrightarrow{\text{ملاحظة}} \frac{(x-2) \times (x^2 + 2x + 4)}{(x-2)(x+2)}$$

$$\begin{aligned} &\rightarrow 2^+ \rightarrow \frac{+1 \times (x^2 + 2x + 4)}{x+2} \xrightarrow{x=2} \frac{17}{4} \\ &\rightarrow 2^- \rightarrow \frac{-1 \times (x^2 + 2x + 4)}{x+2} \xrightarrow{x=2} \frac{-17}{4} \end{aligned}$$

$$\lim_{x \rightarrow 2} \frac{|9x^2 - 1|}{x^2 - 2} = \frac{17}{4}$$

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ج) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin 2x} \xrightarrow{x=\pi} \frac{0}{0}$ $\frac{f'(x)}{g'(x)} \rightarrow \frac{|\sin x|}{\sin 2x} = \frac{|\sin x|}{2 \sin x \cos x}$

2 $\xrightarrow{x^+} \rightarrow \frac{1}{2 \cos x} = \frac{1}{2} \rightarrow \frac{1}{2}$ ✓ $\rightarrow$ $\frac{1}{2}$ $\rightarrow$ $\frac{1}{2}$

3 $\xrightarrow{x^-} \rightarrow \frac{1}{2 \cos x} = \frac{1}{2} \rightarrow \frac{1}{2}$ ✓ $\rightarrow$ $\frac{1}{2}$

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

ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}}$ $\rightarrow 0^+ \rightarrow \sqrt{(x-1)^2 - 1} \rightarrow \sqrt{(0^+-1)^2 - 1} = \sqrt{1-1} = \sqrt{0} = 0$

$\rightarrow 0^- \rightarrow \sqrt{0^- - 2\sqrt{0^-}} \rightarrow 0$ $\rightarrow 0$

و در نهایت $\rightarrow 0$ $\rightarrow$ 0

الف) $\lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^2 - x^5} \rightarrow \lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor 0^+ \rfloor}}{x^2 - x^5} = \frac{1}{x^2 - x^5}$

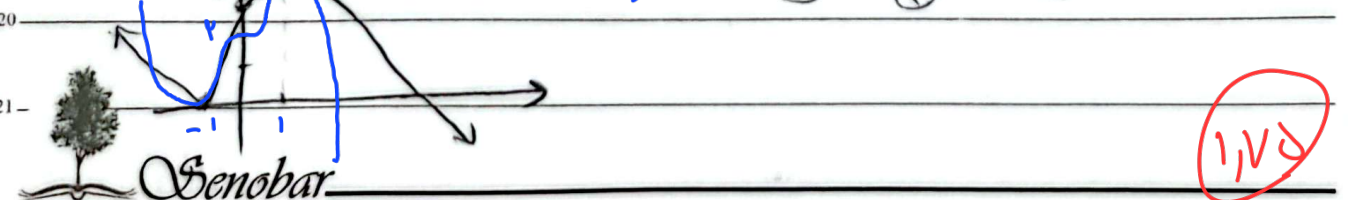
$\rightarrow \frac{1}{1000} - \frac{1}{100} = \frac{1}{900} \rightarrow \frac{1}{900} \rightarrow \frac{1}{900} \rightarrow \frac{1}{900}$ $\rightarrow$ $\frac{1}{900}$ $\rightarrow$ $\frac{1}{900}$

ب) $\lim_{x \rightarrow 2} \frac{x^2 - \lfloor x^2 \rfloor}{x - \lfloor x \rfloor}$ $\xrightarrow{x^+} \rightarrow \frac{x^2 - \lfloor x^2 \rfloor}{x - \lfloor x \rfloor} = \frac{x^2 - 2}{x - 2} = x + 2 \rightarrow 4$

$\xrightarrow{x^-} \rightarrow \frac{x^2 - \lfloor x^2 \rfloor}{x - \lfloor x \rfloor} = \frac{x^2 - 4}{x - 2} = x + 2 \rightarrow 4$

الف) $y = 5x^4 - 4x^3 + 2 \rightarrow y' = -15x^2 + 12x = 0$

$-15x^2(2x^2 - 1) = 0 \rightarrow x = 0, \pm \frac{1}{\sqrt{2}}$



$$\rightarrow) y = x^2 - 2x + 5 \rightarrow y' = 2x - 2 = 0 \rightarrow 2x(x-1) = 0$$

