

بکتاب (مقدماتی) / دایره (مقدماتی)

برای

تکلیف ۱۱.

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

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

$$3) \lim_{x \rightarrow 2} \frac{2x+5}{x+1} \xrightarrow{x=2} \frac{2+5}{2} = \frac{7}{2} = 3.5 \rightarrow 2.$$

$$4) \lim_{x \rightarrow 0} \frac{2x+5}{x^2} \xrightarrow{x=0^+} \frac{2x+5}{0} \rightarrow \infty \quad \xrightarrow{x=0^-} \frac{2x+5}{0} \rightarrow -\infty \rightarrow 2.$$

$$الف) \lim_{x \rightarrow 2^-} \{x\} \rightarrow \{2^- \} = \{2\} - 1 = 1 \quad (4)$$

$$ب) \lim_{x \rightarrow 2^-} [x-1] \rightarrow [2-1] = [1] = 1 \quad (9)$$

$$ج) \left[\lim_{x \rightarrow 2^-} x-1 \right] \rightarrow \lim_{x \rightarrow 2^-} x-1 \rightarrow x-1 = 2-1 = 1 \rightarrow [1] = 1 \quad (10)$$

$$د) \left[\lim_{x \rightarrow 2^+} x-1 \right] \rightarrow \lim_{x \rightarrow 2^+} x-1 \rightarrow x-1 = 2-1 = 1 \rightarrow [1] = 1 \quad (11)$$

$$الف) \lim_{x \rightarrow 2^-} \frac{\{x\}+1}{x} \rightarrow \lim_{x \rightarrow 2^-} \frac{\{2^- \}+1}{x} \rightarrow \lim_{x \rightarrow 2^-} \frac{1+1}{x} = \frac{2}{2} = 1 \quad (12)$$

$$ب) \lim_{x \rightarrow 2^-} \left[\frac{x+1}{x} \right] \rightarrow \lim_{x \rightarrow 2^-} \left[\frac{2+1}{2} \right] = \lim_{x \rightarrow 2^-} \left[\frac{3}{2} \right] = 1 \quad (13)$$

$$ج) \left[\lim_{x \rightarrow 2^-} \frac{x+1}{x} \right] = \left[\frac{2+1}{2} \right] = \left[\frac{3}{2} \right] = 1 \quad (14)$$

$$د) \left[\lim_{x \rightarrow 2^+} \frac{x+1}{x} \right] = \left[\frac{2+1}{2} \right] = \left[\frac{3}{2} \right] = 1 \quad (15)$$

$$الف) \lim_{x \rightarrow 1} \frac{x-1}{x^2-4x+4} = \frac{x-1}{(x-1)(x-1)} \quad \text{تقسیم کنیم بر } x-1 \quad \frac{1}{x-1} \quad (16)$$

$$\begin{aligned} & \lim_{x \rightarrow 1^+} \frac{1-1}{1-4+4} = \frac{0}{0} = \frac{-1}{0^+} = +\infty \\ & \lim_{x \rightarrow 1^-} \frac{1-1}{1-4+4} = \frac{0}{0} = \frac{-1}{0^-} = -\infty \end{aligned} \quad \rightarrow \text{عدم تعین}$$

$$ب) \lim_{x \rightarrow 2} \frac{x-2}{x^2-4x+4} = \frac{x-2}{(x-2)(x-2)} \quad \text{تقسیم کنیم بر } x-2 \quad \frac{1}{x-2} \quad (17)$$

$$\begin{aligned} & \lim_{x \rightarrow 2^+} \frac{2-2}{2^2-4 \cdot 2+4} = \frac{0}{0} = \frac{-1}{0^+} = -\infty \\ & \lim_{x \rightarrow 2^-} \frac{2-2}{2^2-4 \cdot 2+4} = \frac{0}{0} = \frac{-1}{0^-} = -\infty \end{aligned} \quad \rightarrow \text{عدم تعین}$$

پس باید جواب مشخص داشته باشد!



Senobar

$$1) \lim_{x \rightarrow -2} [-3x] - [5x]$$

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

نقطه میانی

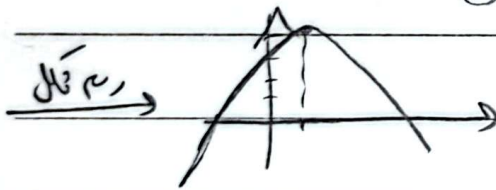
$$\lim_{x \rightarrow -1} \left[-\frac{1}{x^2}\right]$$

$$\rightarrow -\frac{1}{x} > x \text{ مثلاً } -2 < -\frac{1}{x} \rightarrow 14 > \frac{1}{x^2}$$

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

$$2) \lim_{x \rightarrow 1} [x^3 - 5x^2 + 4] \text{ متقارب } -15x^2 + 12x^2 = 0$$

$$\rightarrow -15x^2(x-1) \text{ متقارب } \begin{aligned} &\rightarrow x=1 \rightarrow \varepsilon - 1 + 1 = \varepsilon \\ &\rightarrow x=0 \rightarrow 0 + 4 = 4 \end{aligned}$$



$$\lim_{x \rightarrow 1} [\varepsilon x^3 - 5x^2 + 4] = [\varepsilon^-] = 4$$

$$3) \lim_{x \rightarrow 0} [5x^3 - 4x^2 + 3] \text{ متقارب } -15x^2 + 12x^2 = 0$$

$$\rightarrow -15x^2(x-1) \text{ متقارب } \begin{aligned} &\rightarrow 0^+ \rightarrow [3^+] = 3 \\ &\rightarrow 0^- \rightarrow [3^-] = 3 \end{aligned}$$

$$\begin{aligned} &\rightarrow 0^+ \rightarrow [3^+] = 3 \\ &\rightarrow 0^- \rightarrow [3^-] = 3 \end{aligned} \rightarrow \text{محدود}$$

$$\lim_{x \rightarrow 2} \frac{|x^2 - 1|}{x^2 - 2} \xrightarrow{x=2} \frac{0}{0} \text{ رفع توان } (x-2) \times (x^2 + \varepsilon + 2x)$$

$$\begin{aligned} &\rightarrow 2^+ \rightarrow \frac{+1 \times (x^2 + \varepsilon + 2x)}{x+2} \xrightarrow{x=2} \left(\frac{1}{4}\right) \\ &\rightarrow 2^- \rightarrow \frac{-1 \times (x^2 + \varepsilon + 2x)}{x+2} \xrightarrow{x=2} \left(-\frac{1}{4}\right) \end{aligned} \rightarrow \text{محدود}$$



ج) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin 2x} \xrightarrow{x=\pi} \frac{0}{0}$ رفع ابواب $\frac{|\sin x|}{\sin 2x} = \frac{|\sin x|}{2 \sin x \cos x}$

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

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

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

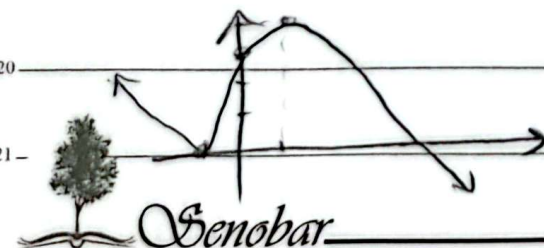
الف) $\lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^x - x^x} \rightarrow \lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor 0^+ \rfloor}}{x^x - x^x} = \frac{1}{x^x - x^x}$

$\rightarrow \frac{1}{\frac{1}{1000} - \frac{1}{100}} = \frac{1}{0} = -\infty$ $\rightarrow$ منساز

ب) $\lim_{x \rightarrow 2} \frac{x^2 - \lfloor x^2 \rfloor}{x - \lfloor x \rfloor}$ $\xrightarrow{x^+} \frac{x^2 - \lfloor x^+ \rfloor}{x - \lfloor x^+ \rfloor} = \frac{x^2 - 2}{x - 2} = x + 2 \rightarrow 6$
 $\xrightarrow{x^-} \frac{x^2 - \lfloor x^- \rfloor}{x - \lfloor x^- \rfloor} = \frac{x^2 - 4}{x - 1} \rightarrow 1$ $\rightarrow$ منساز

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

$-15x^2(x^2 - 1) = 0 \rightarrow x = 0, \pm 1$



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

