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(ریاضیات ۲) (تکلیف ۲۹)

۱)

الف) $\lim_{x\to 2^+} 4x-3 \Rightarrow$

$\lim_{x\to 2^+} 4(2^+)-3 \Rightarrow 8^+-3 = 5^+ = \boxed{5}$

ب) $\lim_{x\to 2^-} 4x-3 \Rightarrow$

$\lim_{x\to 2^-} 4(2^-)-3 = 8^- - 3 = 5^- = \boxed{5}$

۲)

الف) $\lim_{x\to 2^+} 4[x]-3$

$\lim 4[2,\dots\dots 1]-3 = 4(2)-3 = \boxed{5}$

ب) $\lim_{x\to 2^-} 4[x]-3$

$\lim 4[1,999999]-3 = 4-3 = \boxed{1}$

۳)

الف) $\lim_{x\to 2^+} [4x-3]$

$\lim [4(2^+)-3] = [8^+-3] \Rightarrow \boxed{5}$

ب) $\lim [4x-3]$

$\lim [4(2^-)-3] = [8^- -3] = \boxed{4}$

۴)

الف) $[\lim_{x\to 2^+} 4x-3]$

$[\lim_{x\to 2^+} 4x-3] \to [4(2^+)-3] = \boxed{5}$

ب) $[\lim_{x\to 2^-} 4x-3]$

$[\lim_{x\to 2^-} 4x-3] = [4(2^-)-3] = \boxed{5}$

۵)

الف) $\lim_{x\to 3} \frac{4x-3}{x-3} = \frac{9}{0^\sim}$ (حد ندارد)

$\lim_{x\to 3^+} \frac{4x-3}{x-3} = \frac{9}{0^+} = \boxed{+\infty}$

$\lim_{x\to 3^-} \frac{4x-3}{x-3} = \frac{9}{0^-} = \boxed{-\infty}$

ب) $\lim \frac{4x-3}{(x-3)^2} = \frac{9}{(0^\sim)^2}$ (حد ندارد.)

$\lim_{x\to 3^+} \frac{4x-3}{(x-3)^2} = \frac{9}{(0^+)^2} = \boxed{+\infty}$

$\lim_{x\to 3^-} \frac{4x-3}{(x-3)^2} = \frac{9}{(0^-)^2} = \boxed{+\infty}$

Date : ..../........../..........

۶

الف) $\lim\limits_{x\to 3} \dfrac{4x-3}{\sqrt{x-3}} = \dfrac{9}{\sqrt{0^{\sim}}}$

$\lim\limits_{x\to 3^+} \dfrac{4x-3}{\sqrt{x-3}} = \dfrac{9}{\sqrt{0^+}} = \boxed{+\infty}$

$\lim\limits_{x\to 3^-} \dfrac{4x-3}{\sqrt{x-3}} = \dfrac{9}{\sqrt{0^-}} = \boxed{\text{ت ن}}$

ب) $\lim\limits_{x\to 3} \dfrac{4x-3}{\sqrt{x^2-4x+3}} = \dfrac{4x-3}{\sqrt{(x-3)(x-1)}} \Rightarrow^{*}$

$\overset{*}{\Rightarrow} \dfrac{9}{\sqrt{0^{\sim}}}$

	1		3	
+	0	−	0	+

$\lim\limits_{x\to 3^+} \dfrac{4x-3}{\sqrt{x^2-4x+3}} = \dfrac{9}{\sqrt{0^+}} = \boxed{+\infty}$

$\lim\limits_{x\to 3^-} \dfrac{4x-3}{\sqrt{x^2-4x+3}} = \dfrac{9}{\sqrt{0^-}} \Rightarrow \boxed{\text{ت ن}}$

۷

الف) $\lim\limits_{x\to 3} \dfrac{4x-3}{x^2-7x+12} \Rightarrow \dfrac{4x-3}{(x-3)(x-4)} = \dfrac{9}{0^{\sim}}$ (صفرنداره)

	3		4	
+	0	−	0	+

$\lim\limits_{x\to 3^+} \dfrac{4x-3}{x^2-7x+12} = \dfrac{9}{0^-} = \boxed{-\infty}$

$\lim\limits_{x\to 3^-} \dfrac{4x-3}{x^2-7x+12} = \dfrac{9}{0^+} = \boxed{+\infty}$

ب) $\lim \dfrac{4x-3}{[x-3]}$

$\lim\limits_{x\to 3^+} \dfrac{4x-3}{[x-3]} \Rightarrow \underset{\text{صفر خالص}}{\dfrac{9}{0}} = \boxed{\text{ت ن}}$

$\lim\limits_{x\to 3^-} \dfrac{4x-3}{[x-3]} \Rightarrow \dfrac{9}{-1} = \boxed{-9}$

۸

الف) $\lim\limits_{x\to 3} [3x]+[-2x]$ $\boxed{\text{حد دارد}}$

$\lim\limits_{x\to 3^+} [3x]+[-2x] \Rightarrow x>3 \begin{cases} \to 3x>9 \\ \to 2x>6 \to -2x<-6 \end{cases}$

$\to [9,\dots]+[-7,\dots] = 9-7 = \boxed{2}$

$\lim [3x]+[-2x] \Rightarrow x<3 \begin{cases} \to 3x<9 \\ \to -2x>-6 \end{cases}$

$\Rightarrow [8,\dots]+[-6,\dots] \Rightarrow 8-6 = \boxed{2}$

۵

ب) $\lim\limits_{x \to -6} [-4x]+[2x]$

$\lim [-4x]+[2x] \Rightarrow x>-6 \begin{cases} 2x>-12 \\ -4x<24 \end{cases}$

$[23,\ldots]+[-11,\ldots]$

$23-12=\boxed{11}$

$\lim [\underset{24,\ldots}{-4x}]+[\underset{-12,\ldots}{2x}] \Rightarrow x<-6 \begin{cases} 2x<-12 \\ -4x>+24 \end{cases}$

$24-13=\boxed{11}$

۹

الف) $\lim [x^2-4x] \rightarrow \begin{cases} \lim\limits_{x\to 2^+} [x^2-4x] \\ \lim\limits_{x\to 2^-} [x^2-4x] \end{cases}$

$\lim\limits_{x\to 2^+} [x^2-4x] \Rightarrow [x(x-4)] = [2{,}1(2{,}1-4)]$

$[-3{,}99] = \boxed{-4}$

$\lim\limits_{x\to 2^-} [x^2-4x] \Rightarrow [x(x-4)] \quad [1{,}9(1{,}9-4)]$

$[-3{,}99] = -4$

ب) $\lim\limits_{x\to 3} [6x-x^2] \longrightarrow \lim\limits_{x\to 3^+} [6x-x^2] = [x(6-x)] = [3{,}1(6-3{,}1)]$

$= [8{,}99] = \boxed{8}$

حدارد.

$\lim\limits_{x\to 3^-} [6x-x^2] = [x(6-x)] = [2{,}9(6-2{,}9)]$

$= [8{,}99] = \boxed{8}$

Date : ....../....../......

۱۰

الف) $\lim \dfrac{|x-2|}{x^2-3x+2} \rightarrow \lim\limits_{x\to 2^+} = \dfrac{|x-2|}{(x-2)(x-1)}$ حد ندارد

$\lim\limits_{x\to 2^+} \dfrac{(x-2)}{(x-2)(x-1)} = \dfrac{1}{x-1} = \dfrac{1}{2-1} = \boxed{1}$

$\lim\limits_{x\to 2^-} = \dfrac{|x-2|}{(x-2)(x-1)}$

$\lim\limits_{x\to 2^-} \dfrac{-(x-2)}{(x-2)(x-1)} = -\dfrac{1}{x-1} = \dfrac{-1}{2-1} = \boxed{-1}$

ب) $\lim \dfrac{x-[x]}{x^2-1}$ حد ندارد

$\lim\limits_{x\to 1^+} \dfrac{x-1}{(x-1)(x+1)} = \dfrac{1}{x+1} = \boxed{\dfrac{1}{2}}$

$\lim\limits_{x\to 1^-} \dfrac{x-0}{(x-1)(x+1)} = \dfrac{1}{0^-} = \boxed{-\infty}$