آیلا منروخیا

۱. الف) $\lim_{x\to 2^+} \frac{2x+5}{x+1} \to \frac{2(2)+5}{2+1} = \frac{9}{3} = 3$

ب) $\lim_{x\to 2^-} \frac{2x+5}{x+1} \to \frac{2(2)+5}{2+1} = \frac{9}{3} = 3$

ج) $\lim_{x\to 2} \frac{2x+5}{x+1}$ $\begin{cases} 2^+ \to \frac{2(2)+5}{2+1} = \frac{9}{3} = 3 \\ 2^- \to \frac{2(2)+5}{2+1} = \frac{9}{3} = 3 \end{cases}$ $\lim_{x\to 2} \frac{2x+5}{x+1} = 3$

د) $\lim_{x\to 0} \frac{2x+7}{[x^2]} =$ $\begin{cases} 0^+ \to \frac{2(0)+7}{[0^+]} = \text{ت ن} \\ 0^- \to \frac{2(0)+7}{[0^+]} = \text{ت ن} \end{cases}$

۲. الف) $\lim_{x\to 3^-} 4[x]-2 = 4[3^-]-2 = 4(2)-2 = 8-2 = 6$

ب) $\lim_{x\to 3^-} [4x-2] = [4(3^-)-2] = [12^- -2] = [10^-] = 9$

ج) $[\lim_{x\to 3^-} 4x-2] = [4(3)-2] = [10] = 10$

د) $[\lim_{x\to 3^+} 4x-2] = [4(3)-2] = [10] = 10$

۳. الف) $\lim_{x\to 3^-} \frac{3[x]+1}{2} = \frac{3[3^-]+1}{2} = \frac{3(2)+1}{2} = \frac{7}{2}$

ب) $\lim_{x\to 3^-} [\frac{3x+1}{2}] = [\frac{3(3^-)+1}{2}] = [\frac{10^-}{2}] = [5^-] = 4$

ج) $[\lim_{x\to 3^-} \frac{3x+1}{2}] = [\frac{3(3)+1}{2}] = [\frac{10}{2}] = 5$

د) $[\lim_{x\to 3^+} \frac{3x+1}{2}] = [\frac{3(3)+1}{2}] = [\frac{10}{2}] = 5$

آیلار صفر و ضیا

۴. الف) $\lim_{x\to 1} \frac{x-5}{x^2-6x+5} = \frac{1-5}{1-6+5} = \frac{-4}{0}$

$(x-1)(x-5)$

	1		5	
+	0	-	0	+

$1^+ \to \frac{-4}{0^-} = +\infty$

$1^- \to \frac{-4}{0^+} = -\infty$ } حد ندارد

ب) $\lim_{x\to 3} \frac{x-4}{x^2-6x+9} = \frac{3-4}{9-18+9} = \frac{-1}{0}$

$(x-3)^2$

	3	
+	0	+

$3^+ \to \frac{-1}{0^+} = -\infty$

$3^- \to \frac{-1}{0^+} = -\infty$ } حد ندارد

۵. الف) $\lim_{x\to -3} [-3x]-[5x]$

$-3^+ \to [9^-]-[-15^+] = 8-(-15) = 23$

$-3^- \to [9^+]-[-15^-] = 9-(-16) = 25$ } حد ندارد

ب) $\lim_{x\to (-\frac{1}{2})^-} \left[\frac{-1}{x^2}\right] \to [-4^+] = -4$

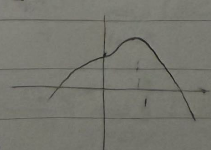
$x < -\frac{1}{2} \to \frac{1}{x} > -2 \to \frac{1}{x^2} < 4$

۶. الف) $\lim_{x\to 1} [4x^3-3x^4+3]$ ، $[12x^2-12x^3] = [12x^2(1-x)]$

	0		1	
+	0	+	0	-

$1^+ \to 3$

$1^- \to 3$



ب) $\lim_{x\to 0} [4x^3-3x^4+3]$ ، $[12x^2-12x^3] = [12x^2(1-x)]$

	0		1	
+	0	+	0	-

$0^+ \to 3$

$0^- \to 2$

Date No

آیلا منوچهری

۷. الف) $\lim_{x\to 2}\frac{|x^3-8|}{x^2-4}$

$2^+ \to \frac{x^3-8}{x^2-4} = \frac{\cancel{(x-2)}(x^2+4+2x)}{\cancel{(x-2)}(x+2)} = \frac{12}{4} = 3$

$2^- \to \frac{8-x^3}{x^2-4} = \frac{-\cancel{(x-2)}(x^2+4+2x)}{\cancel{(x-2)}(x+2)} = \frac{-12}{4} = -3$

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ب) $\lim_{x\to \pi}\frac{|\sin x|}{\sin 2x}$

$\pi^+ \to \frac{-\cancel{\sin x}}{2\cancel{\sin x}\cos x} = \frac{-1}{-2} = \frac{1}{2}$

$\pi^- \to \frac{\cancel{\sin x}}{2\cancel{\sin x}\cos x} = \frac{1}{-2} = \frac{-1}{2}$

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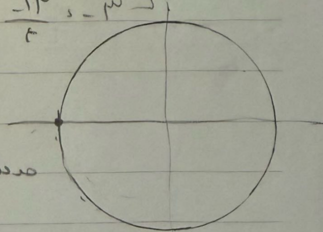
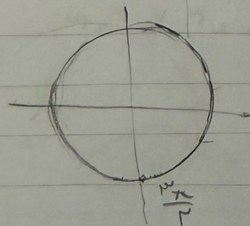


۸. الف) $\lim_{x\to \frac{3\pi}{2}}\sqrt{\cos x}$

$\frac{3\pi}{2}^+ \to \sqrt{0^+} \to 0$

$\frac{3\pi}{2}^- \to \sqrt{0^-}$ تن

حد ندارد



ب) $\lim_{x\to 0}\sqrt{x-2\sqrt{x}}$

$0^+ \to x-2\sqrt{x} \geq 0 \to \sqrt{x}(\sqrt{x}-2) \geq 0$

	0		4	
+		−		+

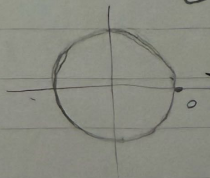
در دامنه 0^+ نیست

$0^- \to$ تن

حد ندارد

۹. الف) $\lim_{x\to 0^+}\frac{(-1)^{[\sin x]}}{x^3-x^2} \to \frac{(-1)^0}{x^3-x^2} = \frac{1}{x^2(x-1)} = \frac{1}{0^-} = -\infty$

	0		1	
−		−		+



ب) $\lim_{x\to 2}\frac{x^2-[x^2]}{x-[x]}$

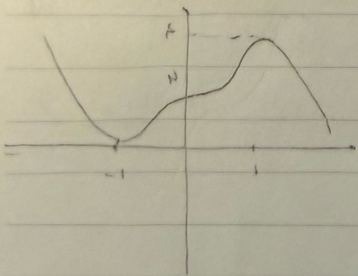
$2^+ \to \frac{x^2-4}{x-2} = \frac{(x+2)\cancel{(x-2)}}{\cancel{x-2}} = x+2 \to 2+2 = 4$

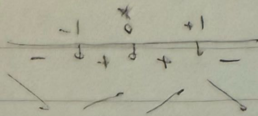
$2^- \to \frac{x^2-3}{x-1} = \frac{1}{1} = 1$

حد ندارد

آیلا هرندی

۵. $y = 5x^3 - 3x^5 + 2 \Rightarrow y' = 15x^2 - 15x^4 = 15x^2(1 - x^2)$



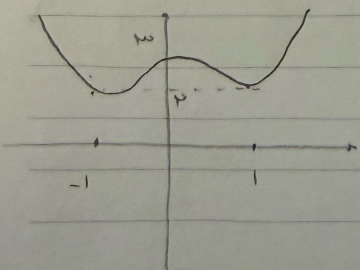


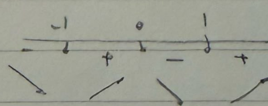
$x = 1 \rightarrow y = 5 - 3 + 2 = 4$

$x = 0 \rightarrow y = 2$

$x = -1 \rightarrow y = -5 + 3 + 2 = 0$

$y = x^4 - 2x^2 + 3 \Rightarrow y' = 4x^3 - 4x = 4x(x^2 - 1)$





$x = 1 \rightarrow y = 2$

$x = 0 \rightarrow y = 3$

$x = -1 \rightarrow y = 2$