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

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

ج) $\lim_{x\to 2} \frac{2x+5}{x+1} = \frac{9}{3} = 3$

د) $\lim_{x\to 0} \frac{2x+7}{[x^2]} = \frac{7}{0}$ تن

حد ندارد

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الف) $\lim_{x\to 3^-} 4[x]-2 = 4\times 2 - 2 = 6$

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

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

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

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

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

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

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

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

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

$$\begin{array}{ccccc} & 1 & & 5 & \\ + & \phi & - & \phi & + \end{array}$$

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

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الف) $\lim_{x\to -3} [-3x]-[5x]$ $\xrightarrow{x\to -3^+}$ $[9^-]-[-15^+] = 8-(-15) = 23$

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

ب) $\lim_{x\to (-\frac{1}{2})^-} [-\frac{1}{x^4}] = [16^+] = 16$

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الف) $\lim_{x\to 1} [4x^3-3x^4+3]$ $\xrightarrow{\text{مشتق}}$ $12x^2-12x^3 = 12x^2(1-x)$

$$\begin{array}{ccccc} & 0 & & 1 & \\ + & \phi & + & \phi & - \end{array}$$

$x=1 \to 4(1)-3(1)+3 = 4 \to [4^-] = 3$

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

	0		1	
+		+		−

$x=0 \Rightarrow 4(0)-3(0)+3=3 \Rightarrow [3^+]=3$

7- الف) $\lim_{x\to 2} \dfrac{|x^3-8|}{x^2-4}$ $\xrightarrow{x\to 2^+}$ $\dfrac{x^3-8}{x^2-4} = \dfrac{(x-2)(x^2+4+2x)}{(x-2)(x+2)} = \dfrac{12}{4} = 3$

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$x\to 2^-$: $\dfrac{8-x^3}{x^2-4} = \dfrac{-1(2-x)(x^2+4+2x)}{(x-2)(x+2)} = -\dfrac{12}{4} = -3$

ب) $\lim_{x\to \pi} \dfrac{|\sin x|}{\sin 2x}$ $\xrightarrow{x\to \pi^+}$ $\dfrac{-\sin x}{2\sin x\cos x} = \dfrac{-1}{2\cos x} = \dfrac{-1}{-2} = \dfrac{1}{2}$

ندارد

$x\to \pi^-$: $\dfrac{\sin x}{2\sin x\cos x} = \dfrac{1}{2\cos x} = \dfrac{1}{-2} = -\dfrac{1}{2}$

8- الف) $\lim_{x\to \frac{3\pi}{2}} \sqrt{\cos x}$ $\xrightarrow{x\to \frac{3\pi}{2}^+}$ $\sqrt{0^+} = 0$

ندارد

$x\to \frac{3\pi}{2}^-$: $\sqrt{0^-} =$ تن

ب) $\lim_{x\to 0} \sqrt{x-2\sqrt{x}}$ $x-2\sqrt{x} \geq 0$

$x-2\sqrt{x} \geq 0 \Rightarrow \sqrt{x}(\sqrt{x}-2) \geq 0$

	0		4	
+		−		+

$x\to 0^+$ تن

$x\to 0^-$ تن ندارد

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

$x^2(x-1)$

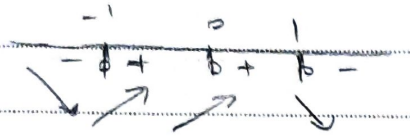
	0		1	
−		−		+

ب) $\lim_{x\to 2} \dfrac{x^2-[x^2]}{x-[x]}$ $\xrightarrow{x\to 2^+}$ $\dfrac{x^2-4}{x-2} = \dfrac{(x-2)(x+2)}{x-2} = 4$

ندارد

$x\to 2^-$: $\dfrac{x^2-4}{x-1} = \dfrac{0}{1} = 0$

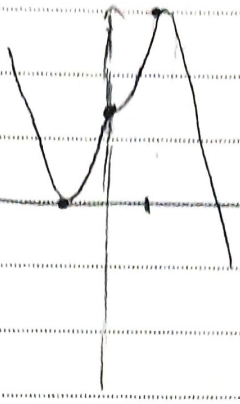
الف) $y = 3x^4 - 5x^3 + 2 \longrightarrow y' = 12x^3 - 15x^2 = 15x^2(1 - x^2)$



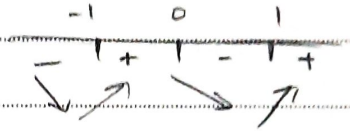
$x = 1 \Rightarrow y = 4$

$x = 0 \Rightarrow y = 2$

$x = -1 \Rightarrow y = 0$



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



$x = 1 \Rightarrow y = 2$

$x = 0 \Rightarrow y = 3$

$x = -1 \Rightarrow y = 2$