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

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

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

د) $\lim_{x\to 0} \frac{2x+7}{[x^2]} = \lim_{x\to 0} \frac{2x+7}{\text{صفر مطلق}} =$ حد ندارد

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

$\lim_{x\to 3^-} [4x]-2 = 9$ $\quad \lim_{x\to 3^-} [12^-]-2 = 11-2 = 9$

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

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

③ الف) $\lim_{x\to 3^-} \frac{3[x]+1}{2} = 3.5$ $\quad \lim_{x\to 3^-} \frac{3(2)+1}{2} = \frac{7}{2}$

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

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

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

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

$\boxed{\text{حد ندارد}}$

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

ارزش قسمت ... الف)

⑤ $\lim_{x\to -3} [-3x]-[5x]$ $\quad -3^+ \to 8+16 = 24$ $\quad -3^- \to 9+16 = 25$

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

$x < -\frac{1}{2} \quad x^4 > \frac{1}{16} \quad -x^4 < -\frac{1}{16}$

$-\frac{1}{x^4} > -16 \to \lim_{x\to (-\frac{1}{2})^-} = -16$

⑥ $\lim_{x\to 1} [4x^3 - 3x^4 + 3] =$

مشتق $\boxed{12x^2 - 12x^3} = f'(x) \to f'(1) = 0$

$\to \lim_{x\to 1} [4^-] = 3$

ب) $\lim_{x\to 0} [4x^3 - 3x^4 + 3] = 3$

$\to f'(x) = 12x^2 - 12x^3 + 3 = 3$ ...

⑦ الف) $\lim_{x\to 2} \frac{|x-2|(x^2+2x+4)}{(x-2)(x+2)}$ مثبت

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

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

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

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

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

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⑧ $\lim_{x\to \frac{3\pi}{2}} \sqrt{\cos x}$

$\frac{3\pi}{2}^+ \to \lim_{x\to \frac{3\pi}{2}^+} 0 = 0$

$\frac{3\pi}{2}^- \to \lim_{x\to \frac{3\pi}{2}^-} \sqrt{0^-} \to$ تعریف نشده

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

$x - 2\sqrt{x} \geq 0$

$x \geq 2\sqrt{x}$

$t^2 - 2t \geq 0$

$t(t-2) \geq 0$

$0^+ \to 0$ تعریف نشده

$0^- \to 0$ تعریف نشده

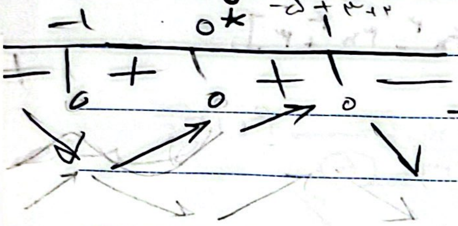
۹) الف) $\lim_{x\to 0^+} \dfrac{(-1)^{[\sin x]}}{x^3 - x^2} \longrightarrow \dfrac{1}{x^3-x^2} \quad \overset{0 \quad 1}{+\,|\,-\,|\,+} \longrightarrow \dfrac{1}{0^-} = -\infty$

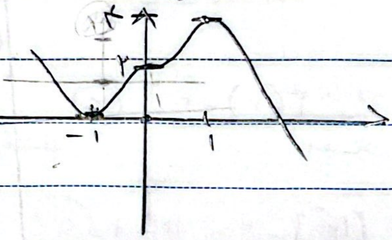
ب) $\lim_{x\to 2} \dfrac{x^2 - [x^2]}{x - [x]}$

$2^+ \longrightarrow \dfrac{x^2-4}{x-2} = x+2 = 4$

$2^- \longrightarrow \dfrac{x^2-3}{x-1} = \dfrac{1}{1} = 1$

۱۰) الف) $y = 5x^3 - 3x^5 + 2 \qquad f'(x) = 15x^2 - 15x^4 \qquad 15x^2(1-x^2) = 15x^2(1-x)(1+x)$





ب) $y = x^4 - 2x^2 + 3 \qquad f'(x) = 4x^3 - 4x \qquad 4x(x-1)(x+1) = 0 \quad 0, -1, 1$