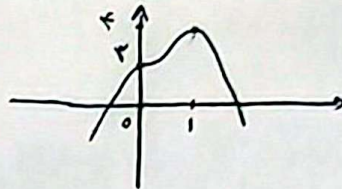


الف) $\lim_{x \rightarrow 1} [4x^3 - 3x^4 + 3] = [4] = \boxed{3}$

$y' = 12x^2 - 12x^3$



6

ب) $\lim_{x \rightarrow 0} [4x^3 - 3x^4 + 3]$ $\begin{cases} 0^+ [3^+] = 3 \\ 0^- [3^-] = 3 \end{cases}$ وجود ندارد.

الف) $\lim_{x \rightarrow 2} \frac{|x^3 - 8|}{x^2 - 4}$ $\begin{cases} 2^+ \frac{x^3 - 8}{x^2 - 4} = \frac{(x-2)(x^2 + 2x + 4)}{(x-2)(x+2)} = \frac{x^2 + 2x + 4}{x+2} = \frac{4}{4} = \boxed{1} \\ 2^- \frac{-(x^3 - 8)}{x^2 - 4} = \frac{-(x-2)(x^2 + 2x + 4)}{(x-2)(x+2)} = \frac{-(x^2 + 2x + 4)}{x+2} = \frac{-4}{4} = \boxed{-1} \end{cases}$ وجود ندارد.

ب) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin 2x}$ $\begin{cases} \pi^+ \frac{\sin x}{\sin 2x} = \frac{\sin x}{2 \sin x \cos x} = \frac{1}{2 \cos x} = \frac{1}{2(-1)} = \boxed{-\frac{1}{2}} \\ \pi^- \frac{-\sin x}{\sin 2x} = \frac{-\sin x}{2 \sin x \cos x} = \frac{-1}{2 \cos x} = \frac{-1}{2(-1)} = \boxed{\frac{1}{2}} \end{cases}$ وجود ندارد.

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الف) $\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x}$ $\begin{cases} \frac{\pi}{2}^+ \sqrt{0^+} = 0^+ \\ \frac{\pi}{2}^- \sqrt{0^-} = \text{ن}$ وجود ندارد.

ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}}$ $\begin{cases} 0^+ \sqrt{0^+ - 2\sqrt{0^+}} = \sqrt{0^-} = \text{ن} \\ 0^- \sqrt{0^- - 2\sqrt{0^-}} = \text{ن} \end{cases}$ وجود ندارد. $0^+ < \sqrt{0^+} \leftarrow 0 < 0^+ < 1$

8

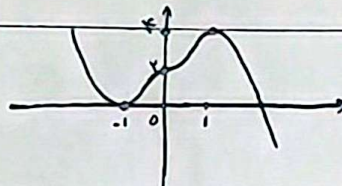
الف) $\lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^x - x^x} = \frac{(-1)^{[0^+]}}{x^x - x^x} = \frac{(-1)^0}{x^x - x^x} = \frac{1}{x^x - x^x} = \frac{1}{x^x(x-1)} = \frac{1}{(0^+)^x \times (0^+ - 1)} = \frac{1}{0^+ \times (-1)^+} = \frac{1}{0^-} = \boxed{-\infty}$

ب) $\lim_{x \rightarrow 2} \frac{x^x - [x^x]}{x - [x]}$ $\begin{cases} 2^+ \frac{x^x - [x^+]}{x - [x^+]} = \frac{x^x - 4}{x - 2} = x + 2 = \boxed{4} \\ 2^- \frac{x^x - [x^-]}{x - [x^-]} = \frac{x^x - 3}{x - 1} = \frac{(2^-)^x - 3}{2^- - 1} = \frac{1^-}{1^-} = \boxed{1} \end{cases}$ وجود ندارد.

9

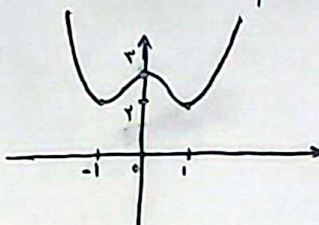
الف) $y = 15x^3 - 2x^5 + 2$

$y' = -15x^4 + 15x^2$



ب) $y = x^4 - 2x^2 + 3$

$y' = 4x^3 - 4x$



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