

$$\lim_{x \rightarrow 1} [f(x) - f(x) + 3] \xrightarrow{\text{مشتق دال}} [12x^2 - 12x^3] \Rightarrow \frac{0}{0} = \frac{0}{0} = \frac{0}{0}$$

$$\rightarrow x \begin{cases} \xrightarrow{+} [x^+] = 1 \\ \xrightarrow{-} [x^-] = 1 \end{cases} = 1$$

$$\rightarrow \lim_{x \rightarrow 0} [f(x) - 3x^2 + 3] \begin{cases} \xrightarrow{+} = 1 \\ \xrightarrow{-} = 1 \end{cases}$$

$$\lim_{x \rightarrow 2} \frac{|x^3 - 1|}{x^2 - 1} = \frac{0}{0} \begin{cases} \xrightarrow{+} \frac{(x-1)(x^2+x+1)}{(x-1)(x+1)} = 1 \\ \xrightarrow{-} \frac{-(x-1)(x^2+x+1)}{(x-1)(x+1)} = -1 \end{cases}$$

$$\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin 2x} \begin{cases} \xrightarrow{\pi^+} \frac{\sin x}{2 \sin x \cos x} = \frac{1}{2} \\ \xrightarrow{\pi^-} \frac{\sin x}{2 \sin x \cos x} = -\frac{1}{2} \end{cases}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} \begin{cases} \xrightarrow{\frac{\pi}{2}^+} \sqrt{0^+} = 0 \\ \xrightarrow{\frac{\pi}{2}^-} \sqrt{0^-} \rightarrow \text{undefined} \end{cases}$$

$$\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \sqrt{x}(\sqrt{x} - 2) \Rightarrow \frac{0}{0} = \frac{0}{0} = \frac{0}{0}$$

$$\lim_{x \rightarrow 0} \sqrt{x}(\sqrt{x} - 2) \rightarrow \text{محدود از بالا و محدود از پایین}$$

$$\lim_{x \rightarrow +} \frac{(-1)^{\lfloor \sin x \rfloor}}{x^2(x-1)} = \lim_{x \rightarrow +} \frac{1}{x^2(x-1)} = \lim_{x \rightarrow +} \frac{1}{0} = -\infty$$

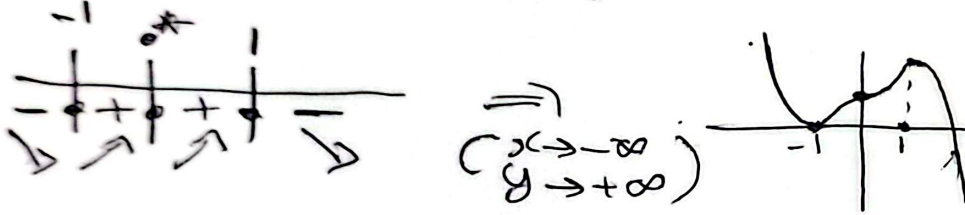
$$(\star) x \rightarrow + \Rightarrow [\sin x] = [0^+] = 0 \Rightarrow (-1)^0 = 1$$

$$\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2} \begin{cases} \xrightarrow{+} \frac{x^2 - 4}{x - 2} = 2 + 2 = 4 \\ \xrightarrow{-} \frac{x^2 - 4}{x - 2} = 1 \end{cases}$$

۲ الف) $y = 5x^3 - 3x^2 + 2$

ب) $y = x^4 - 2x^3 + 2$

$f(x) = 5x^3 - 3x^2 + 2 \Rightarrow f'(x) = 15x^2 - 6x = 3x^2(5 - 2x)$ (الف) ۱۰



$f(x) = x^4 - 2x^3 + 2 \Rightarrow f'(x) = 4x^3 - 6x^2 = x^2(4x - 6)$ (ب)

