

$$\text{الف) } \lim_{x \rightarrow 2^+} \frac{2x+5}{x+1} \rightarrow \frac{2+5}{2} = \underline{3}$$

$$\text{ب) } \lim_{x \rightarrow 2^-} \frac{2x+5}{x+1} \rightarrow \frac{2+5}{2} = \underline{3}$$

$$\text{ج) } \lim_{x \rightarrow 2} \frac{2x+5}{x+1} \rightarrow \frac{2+5}{2} = \underline{3}$$

$$\text{د) } \lim_{x \rightarrow 0} \frac{2x+7}{[x^2]} \rightarrow \begin{cases} \xrightarrow{0^+} \frac{2x+7}{[0^+]} = \infty \\ \xrightarrow{0^-} \frac{2x+7}{[0^+]} = \infty \end{cases}$$

$$\text{الف) } \lim_{x \rightarrow 3^-} f[x] - 2 \rightarrow f \times 2 - 2 = \underline{4}$$

$$\text{ب) } \lim_{x \rightarrow 3^-} [f x - 2] \rightarrow [1 \times 2 - 2] = [0] = \underline{0}$$

$$\text{ج) } \left[\lim_{x \rightarrow 3^-} f x - 2 \right] = \underline{0}$$

$$\text{د) } \left[\lim_{x \rightarrow 3^+} f x - 2 \right] = \underline{0}$$

$$\text{الف) } \lim_{x \rightarrow 2^-} \frac{f[x]+1}{2} \rightarrow \frac{4+1}{2} = \underline{\frac{5}{2}}$$

$$\text{ب) } \lim_{x \rightarrow 2^-} \left[\frac{f x + 1}{2} \right] \rightarrow \lim \left[\frac{1 \cdot 2 + 1}{2} \right] = \underline{1}$$

$$\text{ج) } \left[\lim_{x \rightarrow 2^-} \frac{f x + 1}{2} \right] \rightarrow \frac{4+1}{2} = \underline{2}$$

$$\text{د) } \left[\lim_{x \rightarrow 2^+} \frac{f x + 1}{2} \right] \rightarrow \underline{2}$$

$$\text{الف) } \lim_{x \rightarrow 1} \frac{x-5}{x^2-4x+5} \rightarrow \frac{x-5}{(x-1)(x-5)} = \frac{1}{x-1} \rightarrow \begin{cases} \xrightarrow{1^+} \frac{1}{0^+} = +\infty \\ \xrightarrow{1^-} \frac{1}{0^-} = -\infty \end{cases}$$

$$\text{ب) } \lim_{x \rightarrow 3} \frac{x-5}{x^2-4x+9} \rightarrow \frac{x-5}{(x-3)^2} \rightarrow \begin{cases} \xrightarrow{3^+} \frac{-1}{0^+} = +\infty \\ \xrightarrow{3^-} \frac{-1}{0^+} = +\infty \end{cases}$$

الف) $\lim_{x \rightarrow -2} [-3x] - [0x] \rightarrow [-3x] - [0x]$ آرشیف نشده - 5

-3^+ $\rightarrow 1 + 10 = 23$
 -3^- $\rightarrow 9 + 16 = 25$

ب) $\lim_{x \rightarrow (-1/4)^-} \left[\frac{-1}{x^2} \right] \rightarrow x < -\frac{1}{4} \quad \frac{1}{x} > -2 \quad \frac{1}{x^2} < 16 \quad \frac{-1}{x^2} > -16$

$[-16^+] = -16$

~~الف) $\lim_{x \rightarrow 1} [5x^3 + 3x^2 + 1] \rightarrow [5x^3 + 3x^2 + 1]$~~ - 6

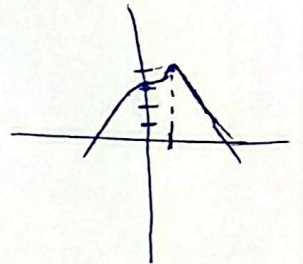
الف) $\lim_{x \rightarrow 1} [5x^3 - 3x^2 + 3] \rightarrow 12x^2 - 12x^3$

1^+ $\rightarrow [f] = 3$
 1^- $\rightarrow [f] = 3$

$12x^2(1-x) \rightarrow \frac{1}{x^2} + \frac{1}{x}$

ب) $\lim_{x \rightarrow 0} [5x^3 - 3x^2 + 3] \rightarrow 12x^2 - 12x^3 \rightarrow \frac{1}{x^2} + \frac{1}{x}$

3^+ $\rightarrow [3^+] = 3$
 3^- $\rightarrow [3^-] = 2$



الف) $\lim_{x \rightarrow 2} \frac{|x^3 - 8|}{x^2 - 4} \rightarrow$ - 7

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

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

π^+ $\rightarrow \frac{-\sin x}{\sin^2 x \cos x} = \frac{-1}{\sin x \cos x} = \frac{-1}{-1} = 1$
 π^- $\rightarrow \frac{\sin x}{\sin^2 x \cos x} = \frac{1}{\sin x \cos x} = -1$

الف) $\lim_{x \rightarrow \frac{\pi}{4}} \sqrt{\cos x} \rightarrow$ - 8

$\frac{\pi}{4}^+$ $\rightarrow \sqrt{0^+} = 0$
 $\frac{\pi}{4}^-$ $\rightarrow \sqrt{0^-} = \text{تعریف نشده}$

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

0^+ $\rightarrow \sqrt{0.01 - 2\sqrt{0.01}} = \sqrt{0.01 - 0.2} = \sqrt{-0.19} = \text{تعریف نشده}$
 0^- $\rightarrow \text{تعریف نشده}$

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

$\frac{1}{-1} = -1$

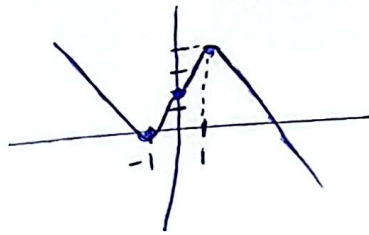
ب) $\lim_{x \rightarrow 2} \frac{x^2 - \lfloor x^2 \rfloor}{x - \lfloor x \rfloor}$

For $x > 2$: $\frac{x^2 - 4}{x - 2} \rightarrow \frac{(x-2)(x+2)}{x-2} = x+2 \rightarrow 4$

For $x < 2$: $\frac{x^2 - 3}{x - 1} \rightarrow \frac{1}{1} = 1$

الف) $y = -3x^5 + 5x^3 + 2 \xrightarrow{\text{مشتق}} -15x^4 + 15x^2 \rightarrow 15x^2(-x^2 + 1)$

$\frac{-1}{-1} = 1$



ب) $y = x^5 - 2x^3 + 3 \xrightarrow{\text{مشتق}} 5x^4 - 6x^2 \rightarrow 5x^2(x^2 - 1)$

$\frac{-1}{-1} = 1$

