

① $\lim_{x \rightarrow 2^+} f(x) - 1 = \Delta$

$\lim_{x \rightarrow 2^-} f(x) - 1 = \Delta$

② $\lim_{x \rightarrow 2^+} f[x] - 1 = \Delta$

$\lim_{x \rightarrow 2^-} f[x] - 1 = 1$

③ $\lim_{x \rightarrow 2^+} [f(x) - 1] = \begin{cases} x > 2 \rightarrow \epsilon x > \Delta \\ -2 \rightarrow \epsilon x - 1 > \Delta \end{cases} \Rightarrow \Delta$

$\lim_{x \rightarrow 2^-} [f(x) - 1] = \begin{cases} x < 2 \rightarrow \epsilon x < \Delta \\ -2 \rightarrow \epsilon x - 1 < \Delta \end{cases} \rightarrow \Delta$

$\left[\lim_{x \rightarrow 2^+} f(x) - 1 \right] = \Delta$

$\left[\lim_{x \rightarrow 2^-} f(x) - 1 \right] = \Delta$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{x - 3} = \frac{9}{0} = \text{جواب نادر } (\pm \infty)$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{(x - 3)^2} = +\infty$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{\sqrt{x - 3}} = +\infty$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{\sqrt{x^2 - 2x + 3}} = +\infty$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{x^2 - \sqrt{x} + 12} : \text{جواب نادر}$

$\lim_{x \rightarrow 3} \frac{f(x) - 1}{[x - 3]} = \begin{cases} \lim_{x \rightarrow 3^+} \frac{x - 1}{0} = \text{جواب نادر} \\ \lim_{x \rightarrow 3^-} \frac{x - 1}{-1} = -9 \end{cases}$

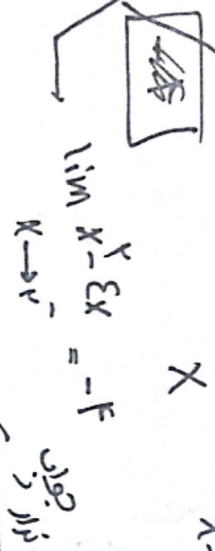
$\lim_{x \rightarrow 3} [3x] + [-2x] = \begin{cases} \lim_{x \rightarrow 3^+} [3x] + [-2x] = 9 - 6 = 3 \\ \lim_{x \rightarrow 3^-} [3x] + [-2x] = 1 - 6 = -5 \end{cases}$

$\lim_{x \rightarrow -4} [-2x] + [2x] = \begin{cases} \lim_{x \rightarrow -4^-} [-2x] + [2x] = 8 - 12 = -4 \\ \lim_{x \rightarrow -4^+} [-2x] + [2x] = 8 - 12 = -4 \end{cases}$

$$\lim_{x \rightarrow r} [x^r - \epsilon x]$$

$$= \lim_{x \rightarrow r} [x^r - \epsilon x] = -\epsilon$$

$$\lim_{x \rightarrow r} [x^r - \epsilon x] = -\epsilon$$



$$\lim_{x \rightarrow r} [ax - x^r]$$

$$= \lim_{x \rightarrow r} [ax - x^r] = a$$

$$\lim_{x \rightarrow r} [ax - x^r] = a$$

$$\lim_{x \rightarrow r} \frac{|x-r|}{x^r - r^r x + r^r}$$

$$\lim_{x \rightarrow r^+} \frac{(x-r)}{(x-r)(x-1)} = \frac{1}{1} = 1$$

$$\lim_{x \rightarrow r^-} \frac{r-r}{(x-r)(x-1)} = -1$$

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$$\lim_{x \rightarrow 1} \frac{x - [x]}{x^r - 1}$$

$$\lim_{x \rightarrow 1^+} \frac{x - [x]}{x^r - 1} = \frac{1}{1+1} = \frac{1}{2}$$

$$\lim_{x \rightarrow 1^-} \frac{x - [x]}{x^r - 1} \rightarrow -\infty$$