

۲. آخرین به سبب

آید نامداری دوازدهم و ستران B - کلیف ۱۸

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الف) $\lim_{x \rightarrow 2^+} \frac{2x+5}{x+1} = \frac{9}{3} = 3$

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

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

✓ > $\lim_{x \rightarrow 2} \frac{2x+5}{[x^2]} = \frac{9}{4}$ ⊂

⊂

الف) $\lim_{x \rightarrow 3^-} f(x) - 2 = 4$

ج) $\left[\lim_{x \rightarrow 3^-} f(x) - 2 \right] = 10$

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ب) $\lim_{x \rightarrow 3^-} [f(x) - 2] = 9$
 $x < 3$
 $f(x) < 12 \Rightarrow f(x) - 2 < 10$

✓ > $\left[\lim_{x \rightarrow 3^+} f(x) - 2 \right] = 10$

⊂

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الف) $\lim_{x \rightarrow 3^-} \frac{3[x] + 1}{2} = \frac{10}{2}$

ج) $\left[\lim_{x \rightarrow 3^-} \frac{3x+1}{2} \right] = 5$

⊂

ب) $\lim_{x \rightarrow 3^-} \left[\frac{3x+1}{2} \right] = 4$
 $x < 3$
 $3x < 9 \Rightarrow 3x+1 < 10$

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

الف) $\lim_{x \rightarrow 1} \frac{x-5}{x^2-4x+5}$

$\frac{34-f(5)}{4+f} \cdot \frac{4-f}{2} = 1$
 $\frac{1}{+} \cdot \frac{5}{-} = -$

$\frac{3x+1}{2} < 5$

$\begin{cases} 1^+ \\ 1^- \end{cases}$

$\frac{-f}{0^-} = +\infty$
 $\frac{-f}{0^+} = -\infty$

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ب) $\lim_{x \rightarrow 3} \frac{x-4}{x^2-4x+9}$

$\frac{3}{+} \cdot \frac{5}{+} = +$

$\begin{cases} 3^+ \\ 3^- \end{cases}$

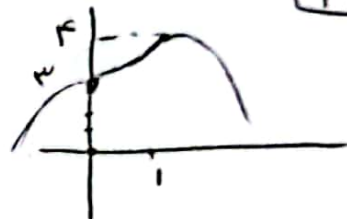
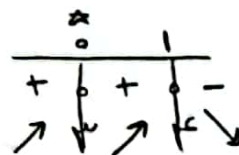
$\frac{-1}{0^+} = -\infty$
 $\frac{-1}{0^-} = -\infty$

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$\lim_{x \rightarrow -3} [-3x] - [5x] \rightarrow -14$
 $x > -3 \Rightarrow -3x < 9$
 $x < -3 \Rightarrow -3x > 9$
 $\lim_{x \rightarrow -3} \left[\frac{-1}{x^2} \right] = -14$
 $\left(-\frac{1}{x} \right)^-$

$x < -\frac{1}{14}$
 $x > \frac{1}{14}$
 $\frac{1}{x^2} < 14$
 $-\frac{1}{x^2} > -14$

$\lim_{x \rightarrow 1} [x^3 - 3x^2 + 2] = 0$
 $12x^2 - 12x = 12x^2(1-x)$



$\lim_{x \rightarrow 0} [x^3 - 3x^2 + 2] = 2$
 $0^+ = 2$
 $0^- = 2$

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

$\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin x} = \frac{1}{-1} = -1$
 $\frac{-\sin x}{\sin x \cos x} = \frac{-1}{-1} = 1$
 $\frac{+\sin x}{\sin x \cos x} = \frac{1}{-1} = -1$



$\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} = 0$
 $\cos > 0 \Rightarrow \sqrt{\cos} > 0$
 $\cos < 0 \Rightarrow \sqrt{\cos} < 0$

$\lim_{x \rightarrow 0} \sqrt{x - x^2} = 0$
 $0^+ \rightarrow 0$
 $0^- \rightarrow 0$



$$\lim_{x \rightarrow 0^+} \frac{[\sin x]}{x^r - x^r}$$

$$\frac{-1^0}{x^r - x^r} = \frac{1}{x^r - x^r} \quad \frac{1}{0^-} \rightarrow -\infty$$

$$\frac{x^r(x-1)}{-1 \quad -1 \quad +}$$



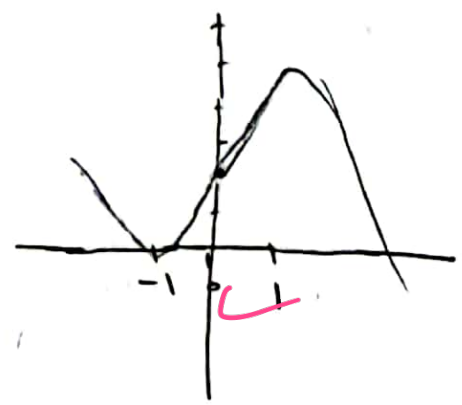
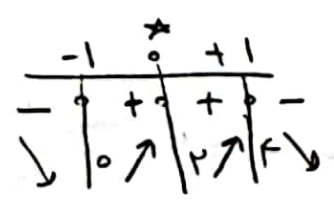
$$\lim_{x \rightarrow r} \frac{x^r - [x^r]}{x - [x^r]} \rightarrow r^+ \quad \frac{x^r - r^r}{x - r} = \frac{(n+r)(n-r)}{(n-r)} = r^r$$

$$\rightarrow r^- \quad \frac{x^r - r^r}{x - r} = \frac{1}{-1} = -1$$

$$w_1) = \omega x^r - r x^{\omega} + r$$

$$-10x^r + 10x^r$$

$$10x^r(-x^r + 1)$$



$$x^r - r x^r + r \quad 1 - r + r$$

$$r x^r - r x$$

$$r x (x^r - 1)$$

