

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

ب) $\lim_{n \rightarrow 2^-} \frac{2n+5}{n+1} \rightarrow \frac{2 \times 2 + 5}{2+1} = \frac{9}{3} = 3$

ج) $\lim_{n \rightarrow 2} \frac{2n+5}{n+1} \rightarrow \frac{2 \times 2 + 5}{2+1} = \frac{9}{3} = 3$

د) $\lim_{n \rightarrow 0} \frac{2n+7}{n^2} \rightarrow \frac{2 \times 0 + 7}{0+} = \frac{7}{0^+} = +\infty$

حاصل به این است که صیغه است پس مخرج صفر

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ت.ن

دست است

الف) $\lim_{n \rightarrow 3^-} \{ \varepsilon n - 2 \} \rightarrow \{ \varepsilon \times 3^- - 2 \} = \{ 1^- \}$

ب) $\lim_{n \rightarrow 3^-} \{ \varepsilon n - 2 \} \rightarrow \{ \varepsilon \times 3^- - 2 \} = \{ 1^- \}$

ج) $\left\{ \lim_{n \rightarrow 3^-} \varepsilon n - 2 \right\} \rightarrow \{ \varepsilon \times 3^- - 2 \} = \{ 1^- \}$

د) $\left\{ \lim_{n \rightarrow 3^+} \varepsilon n - 2 \right\} \rightarrow \{ \varepsilon \times 3^+ - 2 \} = \{ 1^+ \}$

الف) $\lim_{n \rightarrow 3^-} \frac{3 \{ \varepsilon n \} + 1}{2} = \frac{3 \times \{ 3^- \} + 1}{2} = \frac{7}{2}$

ب) $\lim_{n \rightarrow 3^-} \left\{ \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^- + 1}{2} \right\} = \left\{ \frac{10^-}{2} \right\} = \{ 5^- \}$

ج) $\left\{ \lim_{n \rightarrow 3^-} \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^- + 1}{2} \right\} = \{ 5^- \}$

د) $\left\{ \lim_{n \rightarrow 3^+} \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^+ + 1}{2} \right\} = \{ 5^+ \}$

الف) $\lim_{n \rightarrow 1} \frac{n-5}{n^2-4n+5} = \frac{n-5}{(n-5)(n-1)} = \frac{1}{n-1}$
 $\frac{1}{0^+} \rightarrow +\infty$
 $\frac{1}{0^-} \rightarrow -\infty$

ب) $\lim_{n \rightarrow 3} \frac{n-4}{n^2-4n+9} = \frac{-1}{(n-3)^2}$
 $\frac{-1}{0^+} = -\infty$
 $\frac{-1}{0^+} = -\infty$

الف) $\lim_{n \rightarrow -3} \{ -3n \} - \{ 5n \} = \{ 9^- \} - \{ -15^+ \} = 9 - (-15) = 24$
 $\{ 9^+ \} - \{ -15^- \} = 9 - (-14) = 23$

ب) $\lim_{n \rightarrow (-\frac{1}{2})^-} \left\{ \frac{-1}{x^4} \right\} = \left\{ \frac{-1}{(-\frac{1}{2})^4} \right\} = \{ -16^+ \} = -16$
 $\left\{ \frac{-1}{(-\frac{1}{2})^4} \right\} = \{ -16^- \} = -17$

$$\text{الف) } \lim_{n \rightarrow 1} \{ \varepsilon n^3 - 3n^2 + 3 \} = \begin{cases} + \{ \varepsilon \times 1^3 - 3 \times 1^2 + 3 \} = \varepsilon - 3 + 3 = \{ \varepsilon^+ \} = \varepsilon \\ - \{ \varepsilon \times 1^3 - 3 \times 1^2 + 3 \} = \varepsilon - 3 + 3 = \{ \varepsilon^- \} = \varepsilon \end{cases}$$

$$\text{ب) } \lim_{n \rightarrow 0} \{ \varepsilon n^3 - 3n^2 + 3 \} = \begin{cases} + \{ \varepsilon \times 0^3 - 3 \times 0^2 + 3 \} = \{ 3^+ \} = 3 \\ - \{ \varepsilon \times 0^3 - 3 \times 0^2 + 3 \} = \{ 3^- \} = 3 \end{cases}$$

$$\text{الف) } \lim_{n \rightarrow 2} \frac{|n^3 - 1|}{n^2 - 4} = \begin{cases} + \frac{|(2^+)^3 - 1|}{2^2 - 4} = \frac{|8 - 1|}{4 - 4} = \frac{7}{0} = \boxed{\infty} \\ - \frac{|(2^-)^3 - 1|}{2^2 - 4} = \frac{|8 - 1|}{4 - 4} = \frac{7}{0} = \boxed{\infty} \end{cases}$$

چون در دینامیک است و قدر مطلق برابر نباشد
باید در منفی ضرب کنیم

$$\text{ب) } \lim_{n \rightarrow \pi} \frac{|\sin n|}{\sin 2n} = \frac{|\sin n|}{2 \times \sin n \times \cos n} = \begin{cases} + (-1) \times \frac{1}{2 \times \cos} = \boxed{\frac{1}{2}} \\ - \frac{1}{2 \times \cos} = \frac{1}{2 \times (-1)} = \boxed{-\frac{1}{2}} \end{cases}$$

$$\text{الف) } \lim_{n \rightarrow \frac{3\pi}{2}} \sqrt{\cos n} = \begin{cases} + \sqrt{\cos \frac{3\pi}{2}} = \sqrt{0^+} = \boxed{0^+} = 0 \\ - \sqrt{\cos \frac{3\pi}{2}} = \sqrt{0^+} = 0 \end{cases}$$

$$\text{ب) } \lim_{n \rightarrow 0} \sqrt{n - 2\pi n} = \begin{cases} + \sqrt{0^+ - 2\pi 0^+} = \sqrt{0^+ + 0^+} \rightarrow 0 \\ - \sqrt{0^- - 2\pi 0^-} = \sqrt{0^+ + 0^+} \rightarrow 0 \end{cases}$$

$$\text{الف) } \lim_{n \rightarrow 0^+} \frac{(-1)^{\{\sin n\}}}{n^3 - n^2} \rightarrow \frac{-1^0}{0^3 - 0^2} = \frac{1}{0^-} = \boxed{\infty}$$

$$\text{ب) } \lim_{n \rightarrow 2} \frac{n^2 - \{n^2\}}{n - \{n\}} = \begin{cases} + \frac{2^2 - \{2^2\}}{2 - \{2\}} = \frac{4 - 4}{2 - 2} = \frac{0}{0} = \boxed{1} \\ - \frac{2^2 - \{2^2\}}{2 - \{2\}} = \frac{4 - 4}{2 - 2} = \frac{0}{0} = \boxed{1} \end{cases}$$

$$n - 2\sqrt{n} \geq 0 \rightarrow \sqrt{n}(\sqrt{n} - 2) \geq 0 \quad \text{II}$$

$\downarrow$
 $n \geq 0 \quad \text{I}$

$\text{I} \cap \text{II} \quad n \geq 0 \leq n \leq 2 \rightarrow \text{تبراطاف شرطی نیست}$
 $\lim_{n \rightarrow \infty} \sqrt{n - 2\sqrt{n}} = \infty$

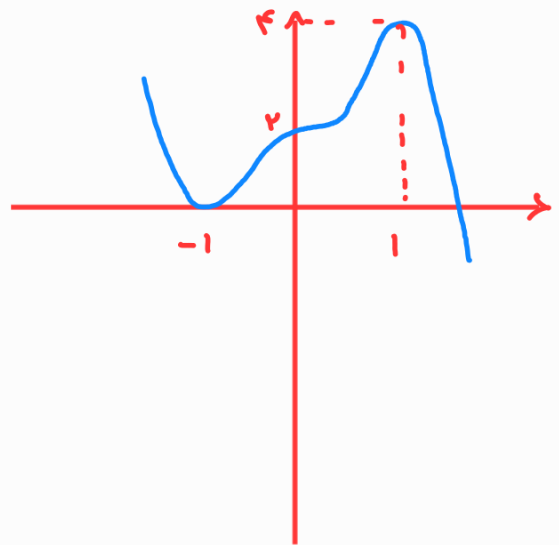
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$$y = 5n^3 - 4n^2 + 2 \rightarrow y' = 15n^2 - 8n$$

الف)

$$y' = 0 \rightarrow 15n^2(1 - \frac{8}{15}n) = 0 \rightarrow n = 0, n = 1, n = -1$$

n	-1	0	1
y'	-	+	+
y	↘	↗	↘



$$y = n^3 - 2n^2 + 2 \rightarrow y' = 3n^2 - 4n$$

ب) ج ۱

$$y' = 0 \rightarrow 3n(n - \frac{4}{3}) = 0 \rightarrow n = 0, n = 1, n = -1$$

n	-1	0	1
y'	-	+	-
y	↘	↗	↘

