

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

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

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

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

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

ب) $\lim_{n \rightarrow 3^-} \{ \varepsilon n - 2 \} \rightarrow \{ \varepsilon \times 3^- - 2 \} = \{ 1.0^- \} = \boxed{9}$

ج) $\left\{ \lim_{n \rightarrow 3^-} \varepsilon n - 2 \right\} \rightarrow \{ \varepsilon \times 3^- - 2 \} = \{ 1.0^- \} = \boxed{1.0}$

د) $\left\{ \lim_{n \rightarrow 3^+} \varepsilon n - 2 \right\} \rightarrow \{ \varepsilon \times 3^+ - 2 \} = \{ 1.0^+ \} = \boxed{1.0}$

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

ب) $\lim_{n \rightarrow 3^-} \left\{ \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^- + 1}{2} \right\} = \left\{ \frac{1.0^-}{2} \right\} = \{ 0 \} = \boxed{4}$

ج) $\left\{ \lim_{n \rightarrow 3^-} \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^- + 1}{2} \right\} = \{ 0 \} = \boxed{0}$

د) $\left\{ \lim_{n \rightarrow 3^+} \frac{3n+1}{2} \right\} = \left\{ \frac{3 \times 3^+ + 1}{2} \right\} = \{ 0 \} = \boxed{0}$

الف) $\lim_{n \rightarrow 1} \frac{n-0}{n^2-4n+0} = \frac{n-0}{(n-0)(n+0)} = \frac{1}{n-1}$
 $\frac{1}{0^+} \rightarrow \boxed{+\infty}$
 $\frac{1}{0^-} \rightarrow \boxed{-\infty}$
 تابع در این نقطه حد ندارد
 حد $\neq$ عدد

ب) $\lim_{n \rightarrow 3} \frac{n-4}{n^2-4n+9} = \frac{-1}{(n-3)^2}$
 $\frac{-1}{0^+} = \boxed{-\infty}$
 $\frac{-1}{0^+} = \boxed{-\infty}$
 تابع در این نقطه حد ندارد
 حد $=$ عدد

الف) $\lim_{n \rightarrow -3} \{ -3n \} - \{ 0n \} = \{ 9^- \} - \{ -10^+ \} = 9 - (-10) = \boxed{19}$
 $\{ 9^+ \} - \{ -10^- \} = 9 - (-10) = \boxed{19}$
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ب) $\lim_{n \rightarrow (-\frac{1}{3})^-} \left\{ \frac{-1}{n^4} \right\} = \left\{ \frac{-1}{\frac{1}{16}^+} \right\} = \{ -16^+ \} = \boxed{-16}$
 $\left\{ \frac{-1}{\frac{1}{16}^-} \right\} = \{ -16^- \} = \boxed{-17}$
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$-\frac{9}{1} \quad \frac{4}{1}$

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

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

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

چون در دینامیک مثبت و منفی دقت در مطلق برابر نباشد

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

$$\text{الف) } \lim_{n \rightarrow \frac{3\pi}{4}} \sqrt{\cos n} = \begin{cases} + \frac{3\pi}{4} \rightarrow \sqrt{\cos \frac{3\pi}{4}} = \sqrt{0^+} = \boxed{0^+} = 0 \\ - \frac{3\pi}{4} \rightarrow \sqrt{\cos \frac{3\pi}{4}} = \sqrt{0^+} \text{ صحیح} \end{cases}$$

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

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

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