

الف) $\lim_{n \rightarrow p^+} \frac{pn + \omega}{n+1} = \frac{p \times p^+ + \omega}{p^+ + 1} = \frac{q^+}{p^+} = p$ ✓

(۱)

ب) $\lim_{n \rightarrow p^-} \frac{pn + \omega}{n+1} = \frac{p \times p^- + \omega}{p^- + 1} = \frac{q^-}{p^-} = p$ ✓

ج) $\lim_{n \rightarrow p} \frac{pn + \omega}{n+1} = \frac{q}{p} = p$ ✓

د) $\lim_{n \rightarrow 0} \frac{pn + v}{[n^p]} = \frac{v}{[0^+]} = \frac{v}{0} = \text{تعریف نشده}$ ✓

(۲)

الف) $\lim_{n \rightarrow p^-} f[n] = p = f(p) - p = q$ ✓

ب) $\lim_{n \rightarrow p^+} [f(n-p)] = [10^-] = q$ ✓

(۲)

ج) $\lim_{n \rightarrow p^-} [f(n-p)] = [10] = 10$ ✓

د) $\lim_{n \rightarrow p^+} [f(n-p)] = [10] = 10$ ✓

(۲)

الف) $\lim_{n \rightarrow p^-} \frac{p[n] + 1}{p} = \frac{p(p) + 1}{p} = \frac{v}{p}$ ✓

ب) $\lim_{n \rightarrow p^-} \left[\frac{pn + 1}{p} \right] = [\omega] = f$ ✓

(۳)

ج) $\lim_{n \rightarrow p^-} \left[\frac{pn + 1}{p} \right] = [\omega] = \omega$ ✓

د) $\lim_{n \rightarrow p^+} \left[\frac{pn + 1}{p} \right] = [\omega] = \omega$ ✓

(۲)

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

$\lim_{n \rightarrow 1^+} \frac{n - \omega}{n^2 - 4n + \omega} = \frac{-f}{0^-} = +\infty$

(۴)

$\lim_{n \rightarrow 1^-} \frac{n - \omega}{n^2 - 4n + \omega} = \frac{-f}{0^+} = -\infty$ ✓

تعریف نشده است

(۲)

ب) $\lim_{n \rightarrow p} \frac{n - f}{n^2 - 4n + q} = \lim_{n \rightarrow p} \frac{n - f}{(n-p)^p}$

$\lim_{n \rightarrow p^+} \frac{n - f}{n^2 - 4n + q} = \frac{-1}{0^+} = -\infty$

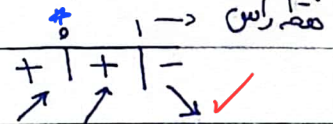
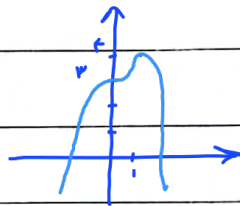
$\lim_{n \rightarrow p^-} \frac{n - f}{n^2 - 4n + q} = \frac{-1}{0^+} = -\infty$ ✓

تعریف نشده است

الف) $\lim_{x \rightarrow -\infty} [-x^3] - [10x] = \frac{-\infty}{-\infty} \rightarrow [9] - [10] = 1 - 10 = -9$ (دائرا)
 $\frac{-\infty}{-\infty} \rightarrow [9] - [-10] = 9 - (-10) = 19$

ب) $\lim_{x \rightarrow (-\frac{1}{4})^-} [-\frac{1}{x^2}] \Rightarrow x \rightarrow (-\frac{1}{4})^- \Rightarrow x < -\frac{1}{4} \Rightarrow x^2 > \frac{1}{16}$
 $\Rightarrow \frac{1}{x^2} < 16 \Rightarrow -\frac{1}{x^2} > -16$
 $\Rightarrow \lim_{x \rightarrow (-\frac{1}{4})^-} [-\frac{1}{x^2}] = [(-16)^+] = -16$ ✓

الف) $\lim_{x \rightarrow 1} [x^3 - 3x^2 + x] \xrightarrow{\text{مستقيم عادي داخل مجال}} 1^3 - 3 \cdot 1^2 + 1 = 1 - 3 + 1 = -1$ (دائرا)
 ب) $\lim_{x \rightarrow 1} [x^3] = [1] = 1$ ✓



ب) $\lim_{x \rightarrow 0} [x^3 - 3x^2 + x] \xrightarrow{\text{مستقيم عادي داخل مجال}} 0^3 - 3 \cdot 0^2 + 0 = 0$
 $x = 0 \Rightarrow \lim [x^3] = 0$

الف) $\lim_{x \rightarrow 2} \frac{|x^2 - 1|}{x^2 - 4} \xrightarrow{2^+} \frac{x^2 - 1}{x^2 - 4} = \frac{(x-1)(x+1)}{(x-2)(x+2)} = \frac{1}{2} = 0.5$ (دائرا)
 $\xrightarrow{2^-} \frac{-(x^2 - 1)}{x^2 - 4} = \frac{-(x-1)(x+1)}{(x-2)(x+2)} = -\frac{1}{2} = -0.5$

ب) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin x} \xrightarrow{\pi^+} \frac{-\sin x}{\sin x \cos x} = \frac{-1}{-1} = 1$ (دائرا)
 $\xrightarrow{\pi^-} \frac{\sin x}{\sin x \cos x} = \frac{1}{-1} = -1$

