

در جدول این سوالات به شکل تابع به صورت دقیق و آسان پاسخ بدهید (استثنا)

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

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

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

$$\text{د) } \lim_{x \rightarrow 0} \frac{x^2 + 7}{x} = \frac{0^2 + 7}{0} \rightarrow \text{تعریف نشده}$$



$$\text{الف) } \lim_{x \rightarrow 3^-} f[x] - 2 = f[3^-] - 2 = 6$$

$$\text{ب) } \lim_{x \rightarrow 3} [x - 2] = [10^-] = 9$$

$$\text{ج) } \left[\lim_{x \rightarrow 3^-} x - 2 \right] = f(3) - 2 = 1$$

$$\text{د) } \left[\lim_{x \rightarrow 3^+} x - 2 \right] = f(3) - 2 = 0$$

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

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

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

$$\text{د) } \left[\lim_{x \rightarrow 3^+} \frac{x^2 + 1}{x} \right] = \frac{3(3) + 1}{3} = \frac{10}{3}$$

$$\text{الف) } \lim_{x \rightarrow 1} \frac{x - 5}{x^2 - 9x + 20} \begin{matrix} \xrightarrow{x \rightarrow 1^+} \frac{0^-}{0^+} = +\infty \\ \xrightarrow{x \rightarrow 1^-} \frac{-4}{0^-} = -\infty \end{matrix}$$

$$\text{ب) } \lim_{x \rightarrow 3} \frac{x - 4}{x^2 - 9x + 20} \begin{matrix} \xrightarrow{x \rightarrow 3^+} \frac{-1}{0^+} = -\infty \\ \xrightarrow{x \rightarrow 3^-} \frac{-1}{0^-} = +\infty \end{matrix}$$

$$\text{الف) } \lim_{x \rightarrow -2} [-3x] - [5x] \begin{matrix} \xrightarrow{x \rightarrow (-2)^+} [9^-] - [-10^+] = 9 - (-10) = 19 \\ \xrightarrow{x \rightarrow (-2)^-} [9^+] - [-10^-] = 9 - (-10) = 19 \end{matrix}$$

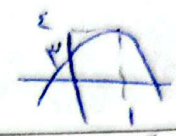
$$\text{ب) } \lim_{x \rightarrow (-\frac{1}{2})^-} \left[-\frac{1}{x^2} \right] = [-16^+] = -16$$

شکل تابع را در ذهن تجسم کنید

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

$$\text{ب) } \lim_{x \rightarrow 1} [x^3 - 2x^2 + 3] = 1^3 - 2 \cdot 1^2 + 3 = 1 - 2 + 3 = 2$$


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

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


$$\text{الف) } \lim_{x \rightarrow 2} \frac{x^2 - 1}{x^2 - 4} = \frac{2^2 - 1}{2^2 - 4} = \frac{3}{0} = \infty$$

$$\text{ب) } \lim_{x \rightarrow 2} \frac{x^2 - 1}{x^2 - 4} = \frac{2^2 - 1}{2^2 - 4} = \frac{3}{0} = \infty$$

$$\text{ج) } \lim_{x \rightarrow 0} \frac{\sin x}{\cos x} = \frac{\sin 0}{\cos 0} = \frac{0}{1} = 0$$

$$\text{د) } \lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} = \sqrt{\cos \frac{\pi}{2}} = \sqrt{0} = 0$$

$$\text{هـ) } \lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \sqrt{0 - 2\sqrt{0}} = \sqrt{0} = 0$$

$$\text{الف) } \lim_{x \rightarrow 1} \frac{(-1)^{x-1}}{x^2 - 1} = \frac{(-1)^0}{1^2 - 1} = \frac{1}{0} = \infty$$

$$\text{ب) } \lim_{x \rightarrow 2} \frac{x^2 - [x]}{x - [x]} = \frac{2^2 - [2]}{2 - [2]} = \frac{4 - 2}{2 - 2} = \frac{2}{0} = \infty$$

$$\text{ج) } f(x) = x^3 - 2x^2 + 3 \rightarrow f'(x) = 3x^2 - 4x = x(3x - 4)$$

$$\text{د) } f(x) = x^3 - 2x^2 + 3 \rightarrow f'(x) = 3x^2 - 4x = x(3x - 4)$$
