

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

$$\rightarrow x \rightarrow 1^+ \sim \frac{1}{0^+} = \boxed{+\infty}$$

$$\rightarrow x \rightarrow 1^- \sim \frac{1}{0^-} = \boxed{-\infty}$$

$$\text{ب) } \lim_{x \rightarrow 3} \frac{x-5}{(x-3)^2} \xrightarrow{x \rightarrow 3^+} \frac{-1}{0^+} = \boxed{-\infty}$$

$$\xrightarrow{x \rightarrow 3^-} \frac{-1}{0^-} = \boxed{-\infty}$$

$$\text{الف) } \lim_{x \rightarrow -3} [-3x] - [5x] \rightarrow 1 - (-15) = 16$$

$$\xrightarrow{x \rightarrow -3^-} 9 - (-14) = 23$$

$$\text{ب) } \lim_{x \rightarrow (-1/4)^-} \left\{ \frac{1}{x^2} \right\} \rightarrow x < -1/4 \rightarrow x^2 > 1/16$$

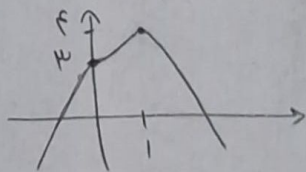
$$\xrightarrow{x \rightarrow (-1/4)^-} \frac{1}{x^2} > 16 \rightarrow \frac{1}{x^2} < -14$$

$$\Rightarrow \boxed{[-14^-] \sim \boxed{-17}}$$

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

$$y' = -12x^3 + 12x^2 \rightarrow 12x^2(1-x)$$

$$\begin{array}{c} 0 \\ +1 +1 - \\ \hline 3 \rightarrow 4 \end{array}$$



$$\text{ب) } \lim_{x \rightarrow 0} [\lim_{x \rightarrow 0} (x^3 - 3x^2 + 3)] \xrightarrow{x \rightarrow 0^-} \boxed{3}$$

$$\xrightarrow{x \rightarrow 0^+} \boxed{3}$$

$$\text{الف) } \lim_{x \rightarrow 2} \frac{|x^3 - 1|}{x^2 - 4} \xrightarrow{x \rightarrow 2^+} \frac{(x-1)(x^2 + x + 1)}{(x-2)(x+2)}$$

$$\sim \frac{4+4+4}{0} = \boxed{12}$$

$$\rightarrow x \rightarrow 2^- \sim \frac{-(x-1)(x^2 + x + 1)}{(x-2)(x+2)} = \boxed{-12}$$

$$\text{الف) } \lim_{x \rightarrow 1} \frac{x+5}{x+1} = \frac{6}{2} = 3$$

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$$\text{ب) } \lim_{x \rightarrow 1} \frac{x+5}{x+1} = \frac{6}{2} = 3$$

$$\text{ج) } \lim_{x \rightarrow 1} \frac{x+5}{x+1} = \frac{6}{2} = 3$$

$$\text{د) } \lim_{x \rightarrow 0} \frac{x+1}{x^2} \xrightarrow{x \rightarrow 0^+} \frac{1}{0^+} = \boxed{+\infty}$$

$$\xrightarrow{x \rightarrow 0^-} \frac{1}{0^-} = \boxed{-\infty}$$

$$\text{الف) } \lim_{x \rightarrow 2} \varepsilon[x] = 2 \rightarrow f(2) = 2 \cdot 9$$

$$x \rightarrow 2^-$$

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

$$x \rightarrow 2^-$$

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

$$\text{د) } [\lim_{x \rightarrow 2^+} \varepsilon x - 2] = [10^+] = 10$$

$$\text{الف) } \lim_{x \rightarrow 2^-} \frac{x^3 + 1}{x} = \frac{9}{2} = 4.5$$

$$\text{ب) } \lim_{x \rightarrow 2^-} \left[\frac{x^3 + 1}{x} \right] = [5^-] = 4$$

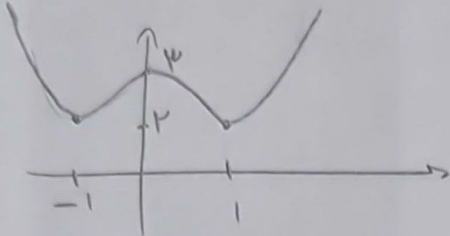
$$\text{ج) } \left[\lim_{x \rightarrow 2^-} \frac{x^3 + 1}{x} \right] = [5^-] = 4$$

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

$$b) y = x^5 - 2x^2 + 3$$

$$y' = 5x^4 - 4x \rightarrow 5x(x^3 - 1)$$

$$\begin{array}{c|ccc} -1 & 0 & 1 & \\ \hline - & + & - & + \\ \hline \downarrow & \nearrow & \downarrow & \nearrow \end{array}$$



$$b) \lim_{x \rightarrow \frac{\pi}{2}} \frac{|\ln x|}{\ln x} \cdot \frac{x^{\frac{\pi}{2}}}{x^{\frac{\pi}{2}}} = \frac{-\ln x}{\ln x} = \frac{-1}{-2} = \frac{1}{2}$$

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

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

$$a) \lim_{x \rightarrow 0^+} \frac{(-1)^{\lfloor \ln x \rfloor}}{x^3 - x^2} = \frac{(-1)^0}{x^2(x-1)} = \frac{1}{0^+ \cdot (-\infty)} = -\infty$$

$$b) \lim_{x \rightarrow 2} \frac{x^2 - (x^2)}{x - (x)} \rightarrow \frac{x^2 - 4}{x - 2} = \frac{x^2 - 4}{x - 2} = \frac{(x-2)(x+2)}{x-2} = x+2 = 4$$

$$a) y = -3x^5 + 5x^3 + 2$$

$$y' = -15x^4 + 15x^2 \rightarrow 15x^2(1 - x^2)$$

$$\begin{array}{c|ccc} -1 & 0 & 1 & \\ \hline - & + & - & + \\ \hline \downarrow & \nearrow & \downarrow & \nearrow \end{array}$$

