

11,5

مهمان نجفی

$$الف) \lim_{x \rightarrow 2^+} \frac{x+5}{x+1} = \frac{7}{3} \quad (3) \checkmark$$

$$ب) \lim_{x \rightarrow 2^-} \frac{x+5}{x+1} = \frac{7}{3} \quad (3) \checkmark$$

$$ج) \lim_{x \rightarrow 2} \frac{x+5}{x+1} = \frac{7}{3} \quad (3) \checkmark$$

$$\gamma) \lim_{x \rightarrow 0} \frac{x^2 + \sqrt{x}}{x^3} \rightarrow \begin{array}{l} 1) x \rightarrow 0^+ \rightarrow x^2 > 0 \rightarrow x^3 > 0 \\ 2) x \rightarrow 0^- \rightarrow x^2 > 0 \rightarrow x^3 < 0 \end{array} \rightarrow x \rightarrow 0 \rightarrow x^2 \rightarrow 0$$

$$\Rightarrow \frac{\sqrt{0}}{0} = \frac{0}{0} \quad \text{تقریباً} \quad \checkmark$$

$$الف) \lim_{x \rightarrow 2^-} f(x) = 2 \rightarrow f(2) = 2 \quad (2) \checkmark$$

$$ب) \lim_{x \rightarrow 2^-} [f(x) - 2] \rightarrow [10^-] = 9 \quad \checkmark$$

$$ج) \left[\lim_{x \rightarrow 2^-} f(x) - 2 \right] = 10 \quad \checkmark$$

$$\gamma) \left[\lim_{x \rightarrow 2^+} f(x) - 2 \right] = 10 \quad \checkmark$$

$$الف) \lim_{x \rightarrow 2^+} \frac{f(x)+1}{x} \rightarrow \frac{f(2)+1}{2} = \frac{7}{2} \quad \checkmark$$

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

$$ج) \left[\lim_{x \rightarrow 2^+} \frac{f(x)+1}{x} \right] \rightarrow 2 \quad \checkmark$$

$$\gamma) \left[\lim_{x \rightarrow 2^+} \frac{f(x)+1}{x} \right] = 2 \quad \checkmark$$

Parsian

حل المسألة

الف) $\lim_{x \rightarrow 1} \frac{x-5}{x^2-4x+5}$ (4)

$\frac{1-5}{1-4+5} = \frac{-4}{2} = -2$

Diagram showing a number line with points 1 and 5. Arrows indicate the limit process.

ب) $\lim_{x \rightarrow 3} \frac{x^2-4}{x^2-4x+9}$ (5)

$\frac{3^2-4}{3^2-4 \cdot 3+9} = \frac{5}{0} = \pm \infty$

Diagram showing a number line with points 3 and 9. Arrows indicate the limit process.

ج) $\lim_{x \rightarrow -3} [x^2] - [2x]$ (6)

$9 - (-6) = 15$

Diagram showing a number line with points -3 and -6. Arrows indicate the limit process.

د) $\lim_{x \rightarrow (-\frac{1}{4})^-} \left[\frac{1}{x^2} \right]$ (7)

$\frac{1}{(-\frac{1}{4})^2} = 16$

Diagram showing a number line with points $-\frac{1}{4}$ and 16. Arrows indicate the limit process.

هـ) $\lim_{x \rightarrow 1} [-x^2 + x^3 + 3]$ (8)

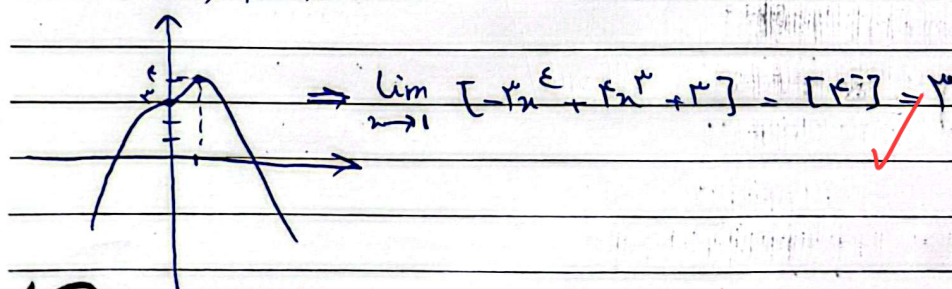
$-1 + 1 + 3 = 3$

Diagram showing a number line with points 1 and 3. Arrows indicate the limit process.

و) $\lim_{x \rightarrow 1} [-x^2 + x^3 + 3]$ (9)

$-1 + 1 + 3 = 3$

Diagram showing a number line with points 1 and 3. Arrows indicate the limit process.



Parsian

طالع کینی

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

چون مقدار معین است پس

$x \rightarrow 0^- \rightarrow \lim_{x \rightarrow 0^-} p(x) = -1$
 $x \rightarrow 0^+ \rightarrow \lim_{x \rightarrow 0^+} p(x) = 0$
 $\lim_{x \rightarrow 0} [x^3 - 3x^2 + 3] = \begin{cases} \lim_{x \rightarrow 0^+} [x^3 - 3x^2 + 3] = 3 \\ \lim_{x \rightarrow 0^-} [x^3 - 3x^2 + 3] = -1 \end{cases}$

الف) $\lim_{x \rightarrow 2} \frac{x^2 - 1}{x^2 - 2}$

$x \rightarrow 2^+ \rightarrow \frac{x^2 - 1}{x^2 - 2} = \frac{(x-1)(x+1)}{(x-2)(x+2)} = \frac{1 \cdot 3}{0^+ \cdot 4} = +\infty$
 $x \rightarrow 2^- \rightarrow \frac{x^2 - 1}{x^2 - 2} = \frac{-1 \cdot 3}{0^- \cdot 4} = +\infty \rightarrow \lim_{x \rightarrow 2} f(x) = +\infty$

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ب) $\lim_{x \rightarrow \pi} \frac{|\sin x|}{\sin x}$

$x \rightarrow \pi^- \rightarrow \frac{|\sin x|}{\sin x} = \frac{\sin x}{\sin x} = \frac{1}{\sin x \cos x} = \frac{1}{0^+ \cdot (-1)} = -\infty$
 $x \rightarrow \pi^+ \rightarrow \frac{|\sin x|}{\sin x} = \frac{-\sin x}{\sin x} = \frac{-1}{\sin x \cos x} = \frac{-1}{0^- \cdot (-1)} = +\infty$
 $\lim_{x \rightarrow \pi} g(x) = \text{تعیین نمی شود}$

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الف) $\lim_{x \rightarrow \frac{3\pi}{2}} \sqrt{\cos x}$

$x \rightarrow \frac{3\pi}{2}^+ \rightarrow \cos \frac{3\pi}{2}^+ = 0^+ \rightarrow \sqrt{0^+} = 0^+$
 $x \rightarrow \frac{3\pi}{2}^- \rightarrow \cos \frac{3\pi}{2}^- = 0^- \rightarrow \sqrt{0^-} = \text{تعیین نمی شود}$
 $\lim_{x \rightarrow \frac{3\pi}{2}} h(x) = \text{تعیین نمی شود}$

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

$x \rightarrow 0^+ \rightarrow \sqrt{x - 2\sqrt{x}} = \sqrt{(\sqrt{x} - 1)^2 - 1} \rightarrow \sqrt{0 - 1} = \sqrt{-1} = \text{تعیین نمی شود}$
 $\lim_{x \rightarrow 0^+} t(x) = \text{تعیین نمی شود}$
 $\lim_{x \rightarrow 0^-} t(x) = \text{تعیین نمی شود}$

1 /

$\lim_{x \rightarrow 0^+} \sin x = 0^+$

بازرسی

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

$\frac{0^+}{0^-} = \frac{1}{0^-}$

ب) $\lim_{x \rightarrow 2} \frac{w(x)}{x - \lfloor x \rfloor}$

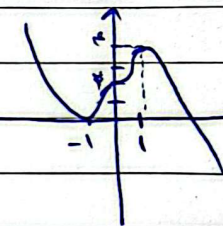
$w(x) = x^2 - \lfloor x^2 \rfloor$

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

$x \rightarrow 2^- \rightarrow \frac{x^2 - 4}{x - 2} = \frac{1}{1} = 1 \rightarrow \lim_{x \rightarrow 2^-} w(x) = 1$

ج) $y = -\frac{1}{2}x^2 + 2x^2, 2 \rightarrow y' = -10x^2 + 4x \rightarrow 10x^2(-x+4)$

$\frac{-1}{-1} + \frac{0^+}{1} = \frac{1}{-1} = -1$



د) $y = x^2 - 2x^2 + 3 \rightarrow y' = 2x^2 - 4x \rightarrow x(x-2)$

$\frac{-1}{-1} + \frac{0}{1} = \frac{1}{-1} = -1$

