

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

$\frac{f(2)+5}{2+1} = 3$ ✓

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

(۱,۵)

ج) $\lim_{x \rightarrow 2} \frac{f(x)+5}{x+1} \xrightarrow{\text{میانگین}} \frac{f(2)+5}{2+1} = 3$ ✓

د) $\lim_{x \rightarrow 0} \frac{f(x)+7}{[x]}$ تعریف نشده خرج صفر دقیق است.
 $\lim_{x \rightarrow 0} \frac{f(x)+7}{[x^2]} = \frac{f(2)+7}{(2^2)} = \frac{11}{4} = 2,75$

ه) $\lim_{x \rightarrow 3^-} f(x) - 2 = f(3) - 2 = 4$ ✓

$x < 3 \rightarrow [x^-] = 2$

و) $\lim_{x \rightarrow 3^-} [f(x) - 2] \Rightarrow [f(3) - 2] = [4] = 4$ ✓
 $x < 3$

(۲)

ز) $\left[\lim_{x \rightarrow 3^-} f(x) - 2 \right] = f(3^-) - 2 = 10 \Rightarrow [10] = 10$ ✓

سوال ۲

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

$$\hookrightarrow [10] = 10$$

الف) $\lim_{x \rightarrow 3^-} \frac{3[x] + 1}{2} = \frac{3[3^-] + 1}{2} = \frac{7}{2} = 3.5$ سوال ۳

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

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

د) $\lim_{x \rightarrow 3^+} \frac{3x + 1}{2} = \frac{3(3^+) + 1}{2} = 5^+ \Rightarrow [5^+] = 5$

سوال ۴

الف) $\lim_{n \rightarrow 1} \frac{n - 5}{n^2 - 4n + 5} = \frac{(n - 5)}{(n - 5)(n - 1)} = \frac{1}{n - 1} = \frac{1}{0^+} = +\infty$

ب) $\lim_{n \rightarrow 1} \frac{n - 5}{n^2 - 4n + 5} = \frac{1}{0^-} = -\infty$

ج) $\lim_{n \rightarrow 3^+} \frac{n - 4}{n^2 - 4n + 9} = \frac{3^+ - 4}{(3^+ - 4)^2} = \frac{-1}{0^+} = -\infty$

د) $\lim_{n \rightarrow 3^-} \frac{n - 4}{n^2 - 4n + 9} = \frac{3^- - 4}{(3^- - 4)^2} = \frac{-1}{0^+} = -\infty$

برای صفحه

اردیبهشت

شنبه



۱۴۴۵ شوال ۱۸

سوال 27 Apr 2024

الف) $\lim_{x \rightarrow -4} [-3x] - [\omega x]$

$x \rightarrow -4$

-4^+

-4^-

$[-3(-4^+)] - [\omega(-4^+)] = 12 + 14 = 26$

$[-3(-4^-)] - [\omega(-4^-)] = 12 + 14 = 26$

$\lim_{x \rightarrow (-4)^+} [-3x] - [\omega x] = 12 - (-14) = 26$

$\lim_{x \rightarrow (-4)^-} [-3x] - [\omega x] = 12 - (-14) = 26$

1

ب) $\lim_{x \rightarrow -\frac{1}{4}} \left[\frac{-1}{x^2} \right] = \left[\frac{-1}{(-\frac{1}{4})^2} \right] = \left[\frac{-1}{\frac{1}{16}} \right] = [-16]$

$= -16$ $x < -\frac{1}{4} \rightarrow x^2 > \frac{1}{16} \rightarrow -x^2 < -\frac{1}{16} \rightarrow -\frac{1}{x^2} > -16 \rightarrow \lim_{x \rightarrow (-\frac{1}{4})^-} \left[\frac{-1}{x^2} \right] = -16$

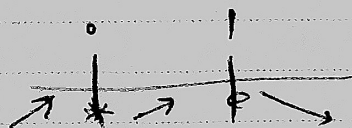
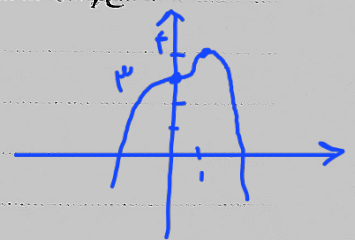
الف) $\lim_{n \rightarrow 1} [x_n^2 - x_n^2 + 2]$

$n \rightarrow 1$

$[x_n^2 - x_n^2 + 2] = 2 \xrightarrow{\text{نقطه}} 1^2 - 1^2 + 2$

$\Rightarrow 1^2 - 1^2 + 2$

x	0	1	2
y'	+	+	-
y	0	2	0



$\Rightarrow [x^2] = 2$

ب) $\lim_{n \rightarrow 0} [x_n^2 - x_n^2 + 2] \rightarrow [0 - 0 + 2] \Rightarrow 2$

$n \rightarrow 0$

$\lim_{n \rightarrow 0} [x_n^2 - x_n^2 + 2] = 0^2 - 0^2 + 2 = 2$

9

uniquely

uniquely

1990 Jan 19

28 Apr 2024

$$\lim_{x \rightarrow p} \frac{10^x - 1}{x^2 - p}$$

→ right
for center

$$\frac{1}{x} = \frac{1}{p}$$

$$(n-r) (n+r)$$

$$\frac{n^2 + r^2}{n+r} = \frac{r}{r} = 1$$

$$(n-r) (n+r)$$

$$\frac{-(n^2 + r^2)}{n+r} = \frac{r}{r} = -1$$

$$\frac{-1}{x} = -\frac{1}{p}$$

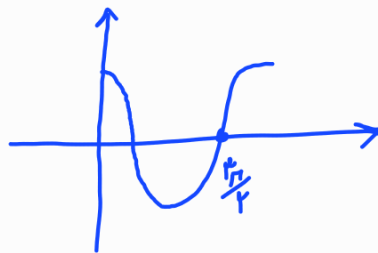
$$\lim_{n \rightarrow \infty} \frac{|\sin n|}{\sin n}$$

①

$$\frac{n^+}{\sin n} = \frac{1}{\sin n} = \frac{1}{\cos n} = \frac{1}{-1} = -\frac{1}{1}$$

$$\frac{n^-}{\sin n} = \frac{1}{\sin n} = \frac{1}{\cos n} = -\frac{1}{1}$$

الف) $\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} \rightarrow \begin{cases} \lim_{x \rightarrow \frac{\pi}{2}^+} \sqrt{\cos x} = \lim_{x \rightarrow \frac{\pi}{2}^+} \sqrt{0^+} = 0 \\ \lim_{x \rightarrow \frac{\pi}{2}^-} \sqrt{\cos x} = \lim_{x \rightarrow \frac{\pi}{2}^-} \sqrt{0^-} = \text{تعریف نشده} \end{cases}$



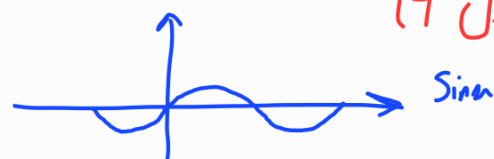
سوال ۱۸

ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \text{تعریف نشده}$ $x \geq 0$ (I)

$x - 2\sqrt{x} \geq 0 \rightarrow \sqrt{x}(\sqrt{x} - 2) \geq 0 \rightarrow \frac{0}{+} \frac{-}{-} \frac{+}{+} \rightarrow x \geq 4 \leq x \leq 0$ (II)

دامنه: $x \geq 4 \leq x = 0$: $(I) \cap (II) \rightarrow x \geq 4 \leq x = 0$: هیچ نقطه ای در تقاطع اطراف صفر تعریف نشده است.

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



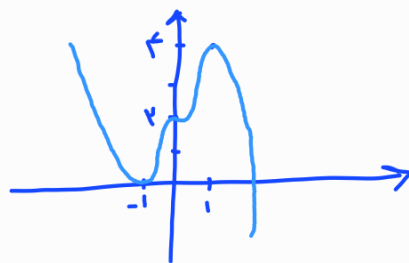
سوال ۱۹

ب) $\lim_{x \rightarrow 2} \frac{x^2 - [x^2]}{x - [x]} = \begin{cases} \lim_{x \rightarrow 2^+} \frac{x^2 - [x^2]}{x - [x]} = \lim_{x \rightarrow 2^+} \frac{x^2 - 4}{x - 2} = \lim_{x \rightarrow 2^+} x + 2 = 4 \\ \lim_{x \rightarrow 2^-} \frac{x^2 - [x^2]}{x - [x]} = \lim_{x \rightarrow 2^-} \frac{x^2 - 3}{x - 1} = \frac{4 - 3}{2 - 1} = 1 \end{cases}$

الف) $y = 2x^3 - 3x^2 + 2$

$y' = 6x^2 - 6x \xrightarrow{y'=0} 6x^2(1-x) = 0 \rightarrow 6x^2(1-x)(1+x) = 0 \rightarrow \begin{cases} x = 0 \\ x = 1 \\ x = -1 \end{cases}$

x	$-\infty$	-1	0	1	$+\infty$
y'	-	+	+	-	-
y	$\searrow$	$\nearrow$	$\nearrow$	$\searrow$	$\searrow$



سوال ۲۰

ب) $y = x^4 - 2x^2 + 2$

$y' = 4x^3 - 4x \xrightarrow{y'=0} 4x(x^2 - 1) = 0 \rightarrow 4x(x-1)(x+1) = 0 \rightarrow \begin{cases} x = 0 \\ x = 1 \\ x = -1 \end{cases}$

x	$-\infty$	-1	0	1	$+\infty$
y'	-	+	-	+	+
y	$\searrow$	$\nearrow$	$\searrow$	$\nearrow$	$\nearrow$

