

①

9, 10

نموده شما به دلیل نزدیکی اسم صفت لحاظ می‌گردد

$$\text{الف) } \frac{r(r) + 5}{r + 1} = \frac{9}{10} = 10 \quad \checkmark$$

$$\text{ب) } \frac{r(r) + 5}{r + 1} = \frac{9}{10} = 10 \quad \checkmark$$

$$\text{پ) } \frac{r(r) + 5}{r + 1} = 10 \quad \checkmark$$

(2)

$$\rightarrow) \frac{r(0) + 5}{[0^+]} = \frac{5}{0^+} \rightarrow 0 \quad \checkmark$$

$$\leftarrow) \frac{r(0) + 5}{[0^+]} = \frac{5}{0^+} \rightarrow 0 \quad \checkmark$$

②

$$\text{الف) } r(r) - r = 9 \quad \checkmark$$

$$\text{ب) } [12 - r] = [10] = 10 \rightarrow 9 \quad \checkmark$$

(2)

$$\text{پ) } [12 - r] = [10] = 10 \quad \checkmark$$

$$\text{د) } [12 - r] = [10] = 10 \quad \checkmark$$

30

الف) $\frac{v(r)+1}{r} = \frac{v}{r}$ ✓

ب) $\left[\frac{q^-+1}{r} \right] = \left[\frac{10^-}{r} \right] = [q^-] = f$ ✓

ج) $\left[\frac{v(r)+1}{r} \right] = [q] = q$ ✓

(y)

د) $\left[\frac{v(r)+1}{r} \right] = [q] = q$ ✓

10

31

$g = (n-a)(n-1)$

الف) $\frac{1-a}{1-a+a} = \frac{-f}{0^-}$

$\frac{1-a}{+ \cdot - \cdot +}$

15

1+ $\rightarrow \frac{-f}{0^-} = +\infty$ ✓

1- $\rightarrow \frac{-f}{0^+} = -\infty$ ✓

(y)

20

ب) $\frac{x-\varepsilon}{(x-\mu)^2} \rightarrow \frac{-1}{0^+} = -\infty$ ✓

23

ج) $\frac{-r^+}{-r^+} [q^-] - [10^+] = 1 \rightarrow 10 - [10] \rightarrow 0$

د) $\frac{-r^+}{-r^+} [q^+] - [-10^-] = 9 + 14 - [20] = 3$ ✓

27

ب) $x < -\frac{1}{r} \rightarrow x^f > \frac{1}{14} \rightarrow \frac{1}{x^f} < 14 \rightarrow \frac{-1}{x^f} > -14$

30

ج) $\left[-\frac{1}{x^f} \right] = -14$ ✓

31

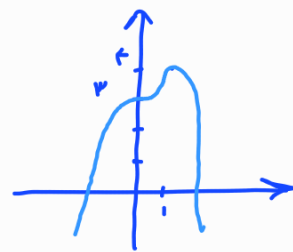


الف) $\lim_{x \rightarrow 1} [f_{x^r} - f_{x^r} + r] \rightarrow \lim_{x \rightarrow 1} [r] = r$

سؤال 4

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

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



ب) $\lim_{x \rightarrow 0} [f_{x^r} - f_{x^r} + r] = \begin{cases} \lim_{x \rightarrow 0^+} [r^+] = r \\ \lim_{x \rightarrow 0^-} [r^-] = r \end{cases}$

سؤال 5

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

x	r
$x^r - 1$	- +

$\lim_{x \rightarrow r^+} \frac{|x^r - 1|}{x^r - r} = \lim_{x \rightarrow r^+} \frac{x^r - 1}{x^r - r} = \lim_{x \rightarrow r^+} \frac{(x-r)(x^r + rx + r^2)}{(x-r)(x+r)} = \frac{1r}{r} = r$

$\lim_{x \rightarrow r^-} \frac{|x^r - 1|}{x^r - r} = \lim_{x \rightarrow r^-} \frac{-(x^r - 1)}{x^r - r} = \lim_{x \rightarrow r^-} \frac{-(x-r)(x^r + rx + r^2)}{(x-r)(x+r)} = \frac{-1r}{r} = -r$

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



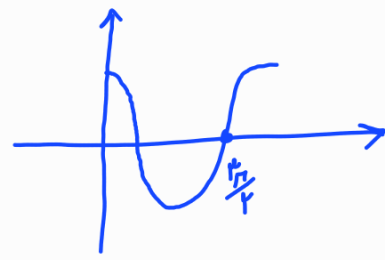
x	π
$\sin x$	+ -

$\lim_{x \rightarrow \pi^+} \frac{|\sin x|}{\sin x} = \lim_{x \rightarrow \pi^+} \frac{-\sin x}{\sin x} = -\frac{1}{r}$

$\lim_{x \rightarrow \pi^-} \frac{|\sin x|}{\sin x} = \lim_{x \rightarrow \pi^-} \frac{\sin x}{\sin x} = \frac{-1}{r}$

سوال ۱۸

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

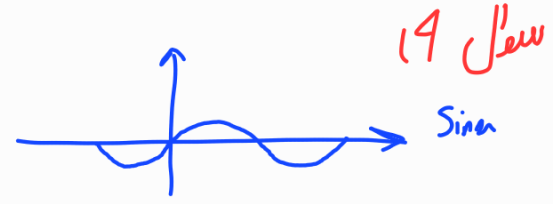


ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \text{تعریف نشده}$ $x \geq 0$ (I)

$x - 2\sqrt{x} \geq 0 \rightarrow \sqrt{x}(\sqrt{x} - 2) \geq 0 \rightarrow \frac{0}{+|-|+} \rightarrow x \geq 4 \leq x \leq 0$ (II)
 دامنه: $x \geq 4 \leq x = 0$: $(I) \cap (II) \rightarrow$ هیچ تابع در نقاط اطراف صفر تعریف نشده.

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

$\frac{+}{-|-|+}$
 $\frac{+}{-|-|+}$

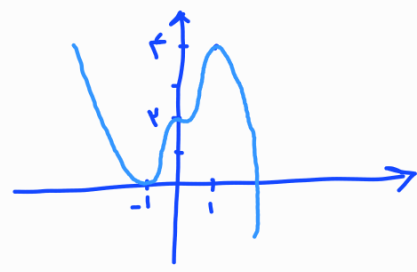


ب) $\lim_{x \rightarrow 2} \frac{x^2 - [x^2]}{x - [x]} = \begin{cases} \lim_{x \rightarrow 2^+} \frac{x^2 - [x^2]}{x - [x]} = \lim_{x \rightarrow 2^+} \frac{x^2 - 4}{x - 2} = \lim_{x \rightarrow 2^+} x + 2 = 4 \\ \lim_{x \rightarrow 2^-} \frac{x^2 - [x^2]}{x - [x]} = \lim_{x \rightarrow 2^-} \frac{x^2 - 4}{x - 1} = \frac{4 - 4}{2 - 1} = 0 \end{cases}$

الف) $y = 3x^3 - 12x^2 + 2$
 $y' = 9x^2 - 24x \xrightarrow{y'=0} 3x(3x - 8) = 0 \rightarrow 3x(1-x)(1+x) = 0 \rightarrow \begin{cases} x = 0 \\ x = 1 \\ x = -1 \end{cases}$

سوال ۱۰

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



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

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

