

مریم توکلی ۱۹۲۵
دانشگاه A به نام نکلیه ۱۸

سوال ۱)

الف) $\lim_{n \rightarrow 2^+} \frac{2n+5}{n+1}$

$n = 2^+ \rightarrow y = \frac{2(2)+5}{2+1} = \frac{9}{3} = \boxed{3}$ ✓

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

$n = 2^- \rightarrow y = \frac{2(2)+5}{2+1} = \frac{9}{3} = \boxed{3}$ ✓

ج) $\lim_{n \rightarrow 2} \frac{2n+5}{n+1}$

$n = 2 \rightarrow y = \frac{2(2)+5}{2+1} = \frac{9}{3} = \boxed{3}$ ✓

د) $\lim_{n \rightarrow \infty} \frac{2n+5}{[n^2]}$

* در اینجا به ۰ مثبت و ۰ منفی، کسرها، صفر شده و حاصل و مرتب شده می شود

$\rightarrow \boxed{\frac{5}{0} = 0.5}$ ✓

الف) $\lim_{n \rightarrow -3} [-2n] - [5n]$

سوال ۵)

$n = -3^+ \rightarrow y = [9^-] - [15^+] = 8 + 15 = \boxed{23}$ ✓

$n = -3^- \rightarrow y = [9^+] - [-15^-] = 9 + 14 = \boxed{23}$ ✓

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

$n < -\frac{1}{2} \rightarrow \frac{1}{n} > -2 \rightarrow \frac{1}{n^4} < 16$

$\rightarrow -\frac{1}{n^4} > -16 \sim -\frac{1}{n^4} = -14^+ \rightarrow [-14^+] = \boxed{-14}$ ✓



پ.ن: بیخیال من سوالات رو به ترتیب بنویسید. واقعاً شرمند.

$$\text{الف) } \lim_{x \rightarrow 2^-} f(x) - 2 \rightarrow (4 \times 2) - 2 = \boxed{6}$$

(سوال ۲)

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$$\text{ب) } \lim_{x \rightarrow 2^-} [f(x) - 2] \rightarrow [f(2^-) - 2] = [2 - 2] = \boxed{0}$$

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$$\text{ج) } \lim_{x \rightarrow 2^-} [f(x) - 2] \rightarrow y = f(2) - 2 = \boxed{10}$$

براکت دور کل، تا اثری در جواب ندارد

$$\text{د) } \lim_{x \rightarrow 2^+} [f(x) - 2] \rightarrow y = f(2) - 2 = \boxed{10}$$

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

(سوال ۳)

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

$$\text{ج) } \lim_{x \rightarrow 2} \frac{3x + 1}{2} \rightarrow \frac{3(2) + 1}{2} = \frac{7}{2} = \boxed{\frac{7}{2}}$$

* براکت دور کل، تا اثری در جواب ندارد

$$\text{د) } \lim_{x \rightarrow 2^+} \frac{3x + 1}{2} \rightarrow \frac{3(2) + 1}{2} = \frac{7}{2} = \boxed{\frac{7}{2}}$$

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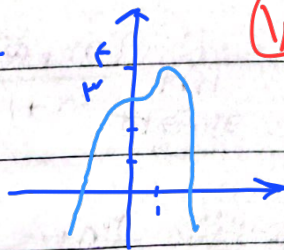
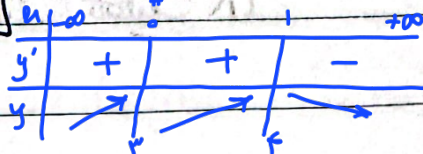
c) $\lim_{n \rightarrow 1} \frac{n-1}{n^2-4n+4} \rightsquigarrow \frac{n-1}{(\cancel{n-1})(n-1)} = \frac{1}{n-1}$ (سوال 5)

$n=1$ $\begin{cases} 1^+ & \frac{1}{0^+} = +\infty \\ 1^- & \frac{1}{0^-} = -\infty \end{cases}$ $\rightarrow$ 2 line

c) $\lim_{n \rightarrow 2} \frac{n-2}{n^2-4n+4} \rightsquigarrow \frac{n-2}{(n-2)^2}$ (2)

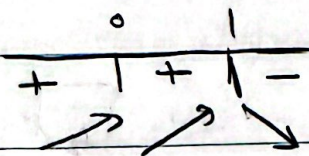
$n=2$ $\begin{cases} 2^+ & \frac{-1}{(0^+)^2} = \frac{-1}{0^+} = -\infty \\ 2^- & \frac{-1}{(0^-)^2} = \frac{-1}{0^+} = -\infty \end{cases}$ $\rightarrow$ 2 line

حل) $\lim_{n \rightarrow 1} [En^r - rn^r + r]$ (سوال 4)



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حساب $\rightarrow -1rn^r + 1rn^r \rightarrow -1rn^r(n-1)$

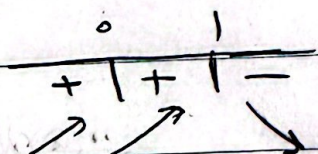


$n=1 \rightarrow f(1) - r(1) + r = r$

$\rightarrow [r^-] = \boxed{r}$ ✓

ب) $\lim_{n \rightarrow 0} [En^r - rn^r + r] \rightarrow \lim_{n \rightarrow 0} [En^r - rn^r + r] = \begin{cases} \lim_{n \rightarrow 0^+} [r^+] = r \\ \lim_{n \rightarrow 0^-} [r^-] = r \end{cases}$

حساب $\rightarrow -1rn^r + 1rn^r \rightarrow -1rn^r(n-1)$



$n=0 \rightarrow f(0) - r(0) + r = r$

$[r^+] = \boxed{r}$

حل) $\lim_{n \rightarrow r} \frac{|n^r - 1|}{n^r - r}$ (سوال 7)

$n=r \rightarrow \frac{r^+}{r^+} + \frac{(n-r)(n^r + r + rn)}{(n-r)(n+r)} \rightarrow \frac{1r}{r} = \boxed{+r}$ ✓

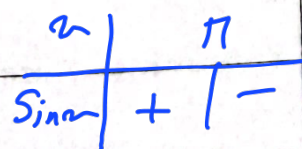
ب) ليد

$r^- \rightarrow \frac{-(n-r)(n^r + r + rn)}{(n-r)(n+r)} = -\frac{1r}{r} = \boxed{-r}$ ✓

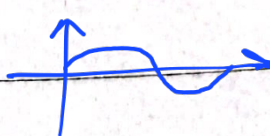
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ب) $\lim_{n \rightarrow \pi} \frac{|\sin n|}{\sin n}$

$n=\pi \rightarrow \frac{-\sin n}{r \sin n \cos n} = \frac{-1}{r \cos n} = \frac{+1}{r}$



$\pi \rightarrow \frac{+\sin n}{r \sin n \cos n} = \frac{+1}{r \cos n} = \frac{-1}{r}$



آپا

(0^-) 0^+

ا) $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{\cos n}$

(سوال 1)

$n = \frac{\pi}{2} + \frac{\pi}{r}$ $y = \sqrt{0^+} = 0^+ \checkmark$
 $n = \frac{\pi}{2} - \frac{\pi}{r}$ $y = \sqrt{0^-} = 00 \checkmark$

سوال

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

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$n = 0^+$ $\sqrt{0^+ - 2\sqrt{0^+}} = 00 \checkmark$
 $n = 0^-$ $\sqrt{0^- - 2\sqrt{0^-}} = 00 \checkmark$

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

(سوال 9)

$$\rightarrow \frac{(-1)^0}{-n^2} = \frac{1}{-n^2} = \frac{1}{0^-} = -\infty \rightarrow \boxed{\text{سوال 10}}$$

$$\text{ب) } \lim_{n \rightarrow r} \frac{n^r - [n^r]}{n - [n]}$$

(2)

$$n=r \begin{cases} r+ & \frac{n^r - \epsilon}{n - r} \rightarrow \frac{(n-r)(n+r)}{n-r} = n+r \rightarrow r+r = \epsilon \\ r- & \frac{n^r - r}{n - 1} \rightarrow \frac{\epsilon - r}{r-1} = \frac{1}{r-1} \end{cases} \rightarrow \boxed{\text{سوال 10}}$$

$$\text{ج) } y = 2n^2 - 3n^0 + 2$$

(سوال 10)

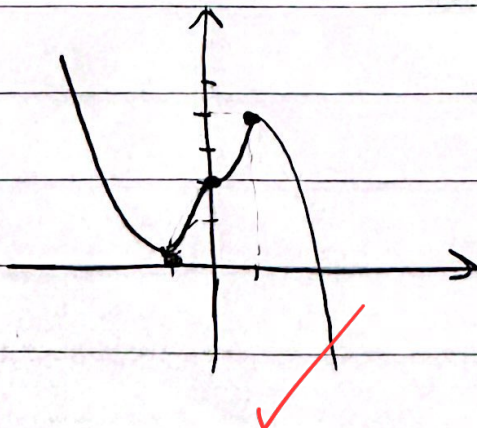
$$\text{حقیقت} \rightarrow y' = -12n^2 + 12n^1 \rightarrow -12n^1 (n-1)(n+1)$$

$$\begin{array}{c} -1 \quad 0 \quad +1 \\ - \quad | \quad + \quad | \quad + \quad | \quad - \\ \swarrow \quad \nearrow \quad \nearrow \quad \searrow \end{array}$$

$$n=1 \rightarrow y = -3(1) + 2(1) + 2 = 1$$

$$n=0 \rightarrow y = 2$$

$$n=-1 \rightarrow y = -3(-1) + 2(-1) + 2 = 0$$



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$$y = x^3 - 3x^2 + 2x$$

$$\text{Derivative} \rightarrow y' = 3x^2 - 6x \rightarrow 3x(x-1)(x+1)$$

	-1	0	+1
-		+	
-		+	
↘	↗	↘	↗

$$x=1 \rightarrow y = 1 - 3 + 2 = 0$$

$$x=0 \rightarrow y = 0$$

$$x=-1 \rightarrow y = 1 - 3 + 2 = 0$$

