

الف) $\lim_{n \rightarrow 2^+} \frac{2n+5}{n+1} \xrightarrow{n=2} \frac{9}{3} = 3$ ✓

ب) $\lim_{n \rightarrow 2^-} \frac{2n+5}{n+1} \xrightarrow{n=2} \frac{9}{3} = 3$ ✓

ج) $\lim_{n \rightarrow 2} \frac{2n+5}{n+1} \xrightarrow{n=2} \frac{9}{3} = 3$ ✓

د) $\lim_{n \rightarrow 0} \frac{2n+V}{[n^2]} \begin{cases} \xrightarrow{0^+} \frac{V}{0} = +\infty \\ \xrightarrow{0^-} \frac{V}{0} = -\infty \end{cases}$

الف) $\lim_{n \rightarrow 2} 2[n] - 2 \xrightarrow{n=2} 1-2 = -1$ ✓
 تعريف نشده $\lim_{n \rightarrow 0} \frac{2n+V}{[n^2]} = \lim_{n \rightarrow 0} \frac{2(0)+V}{[0]} =$

ب) $\lim_{n \rightarrow 2^-} [2n-2] \rightarrow [10] \rightarrow 9$ ✓

ج) $\lim_{n \rightarrow 2^-} [2n-2] \rightarrow 10$ ✓

د) $\lim_{n \rightarrow 2^+} [2n-2] \rightarrow 10$ ✓

الف) $\lim_{n \rightarrow 2^-} \frac{2[n]+1}{2} \rightarrow \frac{5}{2}$ ✓

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

ج) $\lim_{n \rightarrow 2^-} \left[\frac{2n+1}{2} \right] \rightarrow 5$ ✓

د) $\lim_{n \rightarrow 2^+} \left[\frac{2n+1}{2} \right] \rightarrow 4$ ✓

الف) $\lim_{n \rightarrow 1} \frac{n-5}{n^2-4n+8} \begin{cases} \xrightarrow{1^+} \frac{-4}{0^+} = +\infty \\ \xrightarrow{1^-} \frac{-4}{0^-} = -\infty \end{cases}$ ✓

ب) $\lim_{n \rightarrow 1} \frac{n-4}{n^2-4n+9} \begin{cases} \xrightarrow{1^+} \frac{-3}{8} = -\infty \\ \xrightarrow{1^-} \frac{-3}{8} = -\infty \end{cases}$ ✓
 $(n-4)^2$

الف) $\lim_{x \rightarrow -1^+} [-1^+ x] = [-1^+]$ $\xrightarrow{-1^+} 1 + 18 = 19$ ✓
 $\xrightarrow{-1^-} 9 + 18 = 27$ ✓

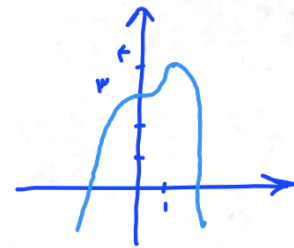
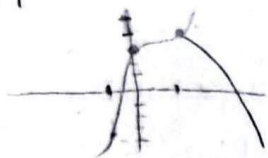
(1) ⑤

ب) $\lim_{x \rightarrow (-\frac{1}{14})^-} \left[\frac{-1}{x^4} \right] \rightarrow \left[\frac{-1}{\frac{1}{14}} \right] \rightarrow [-14] \rightarrow -14$ $\lim_{x \rightarrow (-\frac{1}{14})^-} \left[\frac{-1}{x^4} \right] = -14$
 $x < -\frac{1}{14} \rightarrow x^4 > \frac{1}{14} \rightarrow -x^4 < -\frac{1}{14} \rightarrow -\frac{1}{x^4} > -14$ $x \rightarrow (-\frac{1}{14})^-$

الف) $\lim_{x \rightarrow 1} [f(x)^n - n f(x)^{n-1} + n] \xrightarrow{1^+} \lim_{x \rightarrow 1^+} [f(x)^n + n] = f$
 $\xrightarrow{1^-} \lim_{x \rightarrow 1^-} [f(x)^n] = n$

⑥

(18)



ب) $\lim_{x \rightarrow 0} [f(x)^n - n f(x)^{n-1} + n] \xrightarrow{0^+} \lim_{x \rightarrow 0^+} [n^+] = n$
 $\xrightarrow{0^-} \lim_{x \rightarrow 0^-} [n^-] = n$



(18)

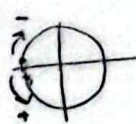
الف) $\lim_{x \rightarrow 1} \frac{|x^n - 1|}{x^n - 1} \xrightarrow{1^+} \frac{x^n - 1}{x^n - 1} = \frac{0}{0} \xrightarrow{\text{لوبيتال}} \frac{(x^n)'(x^n + 1 + \dots + 1)}{(x^n)'(n+1)} = \frac{1}{n} = \frac{1}{n}$

$\rightarrow \frac{14}{1} = 14$

$\xrightarrow{1^-} \frac{-x^n + 1}{x^n - 1} \rightarrow \frac{-(x^n - 1)}{x^n - 1} \rightarrow \frac{-(x^n - 1)(x^n + 1 + \dots + 1)}{(x^n - 1)(n+1)} = \frac{-1}{n} = -\frac{1}{n}$

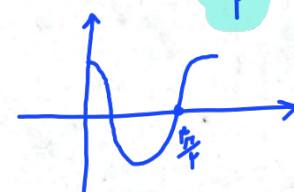
$\rightarrow \frac{-14}{1} = -14$

ب) $\lim_{n \rightarrow \infty} \frac{|\sin n|}{\sin n} \xrightarrow{n^+} \frac{-\sin n}{\sin n} = \frac{0}{0} \xrightarrow{\text{لوبيتال}} \frac{-1}{\cos n} \rightarrow \frac{-1}{\frac{1}{2}} = -2$
 $\xrightarrow{n^-} \frac{\sin n}{\sin n} = \frac{0}{0} \xrightarrow{\text{لوبيتال}} \frac{1}{\cos n} \rightarrow \frac{1}{-\frac{1}{2}} = -2$



(5)

الف) $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{\cos n} \xrightarrow{\text{لوبيتال}} \begin{cases} \lim_{n \rightarrow \frac{\pi}{2}^+} \sqrt{\cos n} = \lim_{n \rightarrow \frac{\pi}{2}^+} \sqrt{0^+} = 0 \\ \lim_{n \rightarrow \frac{\pi}{2}^-} \sqrt{\cos n} = \lim_{n \rightarrow \frac{\pi}{2}^-} \sqrt{0^-} = \text{تعريف نشده} \end{cases}$



①

ب) $\lim_{x \rightarrow 0} \sqrt{x - \sqrt{x}} = \text{تعريف نشده}$ $x > 0$ (I)

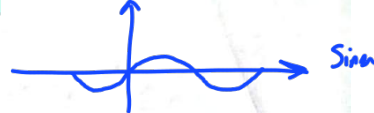
$x - \sqrt{x} \geq 0 \rightarrow \sqrt{x}(\sqrt{x} - 1) \geq 0 \rightarrow \frac{1}{\sqrt{x} + 1} \rightarrow x \geq 1 \leq x \leq 0$ (II)

بانه : $x = 0 \rightarrow x \geq 1 \leq x \leq 0$ (I) \cap (II) $\rightarrow x \geq 1 \leq x \leq 0$: باطل

$$\lim_{n \rightarrow \infty} \frac{-1}{n^n - n^2} = \frac{-1}{\infty} = 0$$



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



$$\lim_{n \rightarrow 2} \frac{n^2 - [n^2]}{n - [n]} \xrightarrow{r^+} \frac{n^2 - 4}{n - 2} = \frac{(n-2)(n+2)}{(n-2)} = 4$$

$$\xrightarrow{r^-} \frac{n^2 - 3}{n - 1} \rightarrow \frac{1}{1} = 1$$

1

$$الف) y = 0n^3 - 3n^2 + 2$$

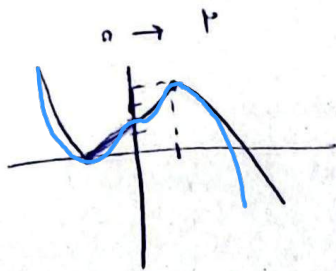
$$\frac{-1}{-1+1+1-}$$

1, 1, 0

$$مشتق = 18n^2 - 18n^3 = 18n^2(-n^2 + 1)$$

$$-1 \rightarrow -8 + 2 + 2 = 0$$

$$1 \rightarrow 8 - 2 + 2 = 8$$



x	-∞	-1	0	1	+∞
y'	-	+	+	-	
y	↘	↗	↗	↘	↘

$$ب) y = n^3 - 2n^2 + 2$$

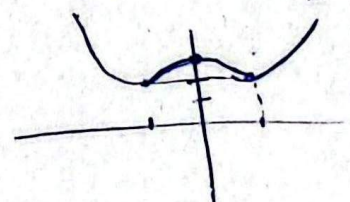
$$\frac{-1}{-1+1-1+}$$

$$مشتق = 3n^2 - 4n = n(3n - 4)$$

$$1 \rightarrow 3$$

$$2 \rightarrow 4$$

$$-1 \rightarrow 3$$



x	-∞	-1	0	1	+∞
y'	-	+	-	+	
y	↘	↗	↘	↗	↗