

الف) $\lim_{x \rightarrow r^+} f(x-r) = \infty$

$\lim_{x \rightarrow r^+} f(x^+) - r = \infty$

ب) $\lim_{x \rightarrow r^-} f(x-r) = \infty$

$\lim_{x \rightarrow r^-} f(x^-) - r = \infty$

۱

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

$= f[r^+] - r = f(r) - r = \infty$

ب) $\lim_{x \rightarrow r^-} f[x-r] = 1$

$f[r^-] - r = f(l) - r = 1$

۲

الف) $\lim_{x \rightarrow r^+} [f(x-r)]$

$= [f(r^+) - r] = [\infty^+] = \infty$

ب) $\lim_{x \rightarrow r^-} [f(x-r)]$

$= [f(r^-) - r] = [\infty^-] = f$

۳

الف) $\left[\lim_{x \rightarrow r^+} f(x-r) \right] = \infty$

$\lim_{x \rightarrow r^+} f(x-r) = \infty$

$[\infty] = \infty$

ب) $\left[\lim_{x \rightarrow r^-} f(x-r) \right] = \infty$

$\lim_{x \rightarrow r^-} f(x-r) = \infty$

$\rightarrow [\infty] = \infty$

۴

الف) $\lim_{x \rightarrow r} \frac{f(x-r)}{x-r}$

$\begin{matrix} r^+ & \rightarrow & \frac{9}{0^+} = +\infty \\ & & \\ r^- & \rightarrow & \frac{9}{0^-} = -\infty \end{matrix}$

ب) $\lim_{x \rightarrow r} \frac{f(x-r)}{(x-r)^2}$

$\begin{matrix} r^+ & \rightarrow & \frac{9}{0^+} = +\infty \\ & & \\ r^- & \rightarrow & \frac{9}{0^-} = +\infty \end{matrix}$

۵

الف) $\lim_{x \rightarrow c} \frac{c-x}{\sqrt{x-c}}$

x^+ $\rightarrow \frac{c}{\sqrt{0^+}} = +\infty$
 x^- $\rightarrow \frac{c}{\sqrt{0^-}} = \infty$

ب) $\lim_{x \rightarrow c} \frac{c-x}{\sqrt{x^2-cx+c}}$ $\rightarrow \frac{1}{+1-1+}$

x^+ $\rightarrow \frac{c}{\sqrt{0^+}} = +\infty$
 x^- $\rightarrow \frac{c}{\sqrt{0^-}} = \infty$

6

الف) $\lim_{x \rightarrow c} \frac{cx-c}{x^2-\sqrt{x+1}}$

x^+ $\rightarrow \frac{c}{0^-} = -\infty$
 x^- $\rightarrow \frac{c}{0^+} = +\infty$

ب) $\lim_{x \rightarrow c} \frac{cx-c}{[x-c]}$

x^+ $\rightarrow \frac{c}{[0^+]} = \frac{c}{0} = \infty$
 x^- $\rightarrow \frac{c}{[0^-]} = \frac{c}{-1} = -c$

7

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

n^+ $\rightarrow [9^+] + [-9^-] = 0$
 n^- $\rightarrow [9^-] + [-9^+] = 0$

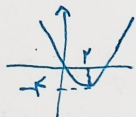
ب) $\lim_{n \rightarrow -4} [-4n] + [3n]$

n^+ $\rightarrow [-16^-] + [12^+] = 1$
 n^- $\rightarrow [-16^+] + [12^-] = 1$

8

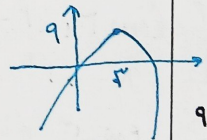
الف) $\lim_{x \rightarrow c} [2x - \sqrt{x}]$

x^+ $\rightarrow [-c^+] = -c$
 x^- $\rightarrow [-c^+] = -c$



ب) $\lim_{x \rightarrow c} [4x - 2x^2]$

x^+ $\rightarrow [4] = 1$
 x^- $\rightarrow [4^-] = 1$



9

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

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

ب) $\lim_{x \rightarrow 1} \frac{x - [x]}{x^2-1}$

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

$\frac{1}{2}$