

$$الف) \lim_{x \rightarrow 2^+} \frac{2x+5}{x+1} = \lim_{x \rightarrow 2^+} \frac{2(2)+5}{2+1} = 3$$

$$ج) \lim_{x \rightarrow 2} \frac{2x+5}{x+1} = \lim_{x \rightarrow 2} \frac{2(2)+5}{2+1} = 3$$

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

$$د) \lim_{x \rightarrow 0} \frac{2x+1}{[x^2]} \quad \begin{array}{l} x > 0 \Rightarrow x^2 > 0 \\ x < 0 \Rightarrow x^2 > 0 \end{array} \quad \begin{array}{l} \lim_{x \rightarrow 0^+} \frac{1}{x^2} = +\infty \\ \lim_{x \rightarrow 0^-} \frac{1}{x^2} = +\infty \end{array}$$

$$الف) \lim_{x \rightarrow 10^-} \varepsilon[x] - 2 = \lim_{x \rightarrow 10^-} \varepsilon[10^-] - 2 = \lim_{x \rightarrow 10^-} \varepsilon(9) - 2 = 9$$

$$ب) \lim_{x \rightarrow 10^-} [\varepsilon x - 2] = \lim_{x \rightarrow 10^-} [\varepsilon(10^-) - 2] = 9$$

$$د) [\lim_{x \rightarrow 10^+} \varepsilon x - 2] = [\lim_{x \rightarrow 10^+} \varepsilon(10^+) - 2] = 10$$

$$ج) [\lim_{x \rightarrow 10^-} \varepsilon x - 2] = [\lim_{x \rightarrow 10^-} \varepsilon(10^-) - 2] = 10$$

$$الف) \lim_{x \rightarrow 10^-} \frac{3[x] + 1}{2} = \lim_{x \rightarrow 10^-} \frac{3[10^-] + 1}{2} = \lim_{x \rightarrow 10^-} \frac{3(9) + 1}{2} = \frac{28}{2} = 14$$

$$ب) \lim_{x \rightarrow 10^-} \left[\frac{3x+1}{2} \right] = \lim_{x \rightarrow 10^-} [14^-] = 13$$

$$د) \left[\lim_{x \rightarrow 10^+} \frac{3x+1}{2} \right] = \left[\lim_{x \rightarrow 10^+} \frac{3(10^+) + 1}{2} \right] = 15$$

$$ج) \left[\lim_{x \rightarrow 10^-} \frac{3x+1}{2} \right] = \left[\lim_{x \rightarrow 10^-} \frac{3(10^-) + 1}{2} \right] = 14$$

$$الف) \lim_{x \rightarrow 1} \frac{x-5}{x^2-7x+5} = \begin{array}{l} x \rightarrow 1^+ \Rightarrow \lim_{x \rightarrow 1^+} \frac{-4}{-6} = \frac{2}{3} \\ x \rightarrow 1^- \Rightarrow \lim_{x \rightarrow 1^-} \frac{-4}{-6} = \frac{2}{3} \end{array}$$

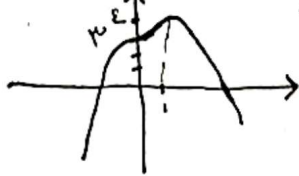
$$ب) \lim_{x \rightarrow 1} \frac{x-5}{x^2-7x+5} = \lim_{x \rightarrow 1} \frac{x-5}{(x-1)^2} = \begin{array}{l} x \rightarrow 1^+ \Rightarrow \lim_{x \rightarrow 1^+} \frac{-4}{0^+} = +\infty \\ x \rightarrow 1^- \Rightarrow \lim_{x \rightarrow 1^-} \frac{-4}{0^+} = +\infty \end{array}$$

$$الف) \lim_{x \rightarrow -3} [\frac{1}{x}] - [\frac{1}{3}] = \begin{array}{l} x \rightarrow -3^+ \Rightarrow \frac{1}{-3^+} - \frac{1}{3} = -\frac{2}{3} \\ x \rightarrow -3^- \Rightarrow \frac{1}{-3^-} - \frac{1}{3} = -\frac{4}{3} \end{array}$$

$$ب) \lim_{x \rightarrow (-\frac{1}{3})^-} \left[\frac{1}{x} \right] = -14$$

$$x < -\frac{1}{3} \Rightarrow x^E > \frac{1}{19} \Rightarrow \frac{1}{x^E} < 19 \Rightarrow -\frac{1}{x^E} > -19$$

ا) $\lim_{x \rightarrow 1} [\varepsilon x^3 - 3x\varepsilon + 3] = 3$



$y' = 3x^2 - 6x + 3$
 $= -3x(x-1)$

x	-1	0	1
y'	+	0	+
y	↗	↘	↗

ب) $\lim_{x \rightarrow 0} [\varepsilon x^3 - 3x\varepsilon + 3] = 3$

ا) $\lim_{x \rightarrow 2} \frac{|x^3 - 1|}{x^2 - 2} = \lim_{x \rightarrow 2^+} \frac{x^3 - 1}{x^2 - 2} = \lim_{x \rightarrow 2^+} \frac{(x-1)(x^2+x+1)}{(x-2)(x+2)} = \frac{1}{2} = 0.5$

ب) $\lim_{x \rightarrow 0} \frac{|\sin x|}{\sin 2x} = \lim_{x \rightarrow 0^+} \frac{-\sin x}{\sin 2x} = \frac{1}{2}$

ا) $\lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} = 0$

ب) $\lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \lim_{x \rightarrow 0^+} \sqrt{(x-1)^2 - 1} = \sqrt{1-1} = 0$

ا) $\lim_{x \rightarrow 0^+} \frac{(-1)^{\sin x}}{x^3 - x^2} = \frac{(-1)^0}{x^3 - x^2} = \frac{1}{x^3 - x^2} = \frac{1}{x^2(x-1)} = \frac{1}{0^-} = -\infty$

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

ا) $y = 2x^3 - 3x^2 + 3$
 $y' = 6x^2 - 6x$
 $y' = 6x(x-1)$



x	-1	0	1
y'	-	0	+
y	↘	↘	↗

$y' = 6x^2 - 6x$
 $= 6x(x-1)$

x	-1	0	1
y'	-	0	+
y	↘	↘	↗

