

الف) $\lim_{x \rightarrow 2^-} \frac{2x+5}{x+1} = \frac{9}{3} = 3$ ب) $\lim_{x \rightarrow 2^+} \frac{2x+5}{x+1} = \frac{9}{3} = 3$ (1)

ج) $\lim_{x \rightarrow 2} \frac{2x+5}{x+1} = \frac{9}{3} = 3$ د) $\lim_{x \rightarrow 0} \frac{2x+5}{[x^2]} = \frac{5}{-1} = -5$ دو برابر

هـ) $\lim_{x \rightarrow 2^-} f(x) - 2 = 3 - 2 = 1$ ب) $\lim_{x \rightarrow 2^+} f(x) - 2 = [1] = 1$ (2)

ج) $\left[\lim_{x \rightarrow 2} f(x) - 2 \right] = 1$ د) $\left[\lim_{x \rightarrow 2} f(x) - 2 \right] = 1$ جواب عددی است

هـ) $\lim_{x \rightarrow 2^-} \frac{3[x]+1}{2} = \frac{3(2)+1}{2} = \frac{7}{2}$ ب) $\lim_{x \rightarrow 2^+} \left[\frac{3x+1}{2} \right] = [5] = 5$ (3)

ج) $\left[\lim_{x \rightarrow 2^-} \frac{3x+1}{2} \right] = \frac{3(2)+1}{2} = 5$ د) $\left[\lim_{x \rightarrow 2^+} \frac{3x+1}{2} \right] = 5$

هـ) $\lim_{x \rightarrow 1} \frac{x-5}{x^2-4x+5} = \frac{0}{0} = \frac{1}{-3} = -\frac{1}{3}$ (4)

ب) $\lim_{x \rightarrow 3} \frac{x-4}{x^2-4x+4} = \frac{0}{0} = \frac{1}{-5} = -\frac{1}{5}$ صفر بر صفر

الف) $\lim_{x \rightarrow -2} [-3x] - [5x] = -2 = [9] - [15] = 8 - 15 = -7$ (5)

ب) $\lim_{x \rightarrow (\frac{1}{2})^-} \left[\frac{1}{x^2} \right] = 4$ (6)

الف) $\lim_{n \rightarrow 1} [f_n^3 - 4n^2 + 3]$ $\xrightarrow{\text{مستقيم}}$ $1^3 - 4 \cdot 1^2 + 3 = 0$ $\frac{0}{0}$ $\xrightarrow{\text{ل'Hôpital}}$ $\lim_{n \rightarrow 1} \frac{3f_n^2 - 8n}{2n} = \frac{3(1)^2 - 8(1)}{2(1)} = \frac{-5}{2}$

ب) $\lim_{n \rightarrow 0} [f_n^3 - 4n^2 + 3]$ $\xrightarrow{\text{مستقيم}}$ $0^3 - 4 \cdot 0^2 + 3 = 3$ $\frac{3}{0}$ $\rightarrow \infty$

الف) $\lim_{n \rightarrow 2} \frac{|n^3 - 1|}{n^2 - 4}$ $\xrightarrow{\text{مستقيم}}$ $\frac{(n-1)(n^2 + n + 1)}{(n-2)(n+2)}$ $\xrightarrow{\text{ل'Hôpital}}$ $\frac{3n^2 + 2n - 1}{2n + 2}$ $\xrightarrow{n=2}$ $\frac{12 + 4 - 1}{6} = \frac{15}{6} = \frac{5}{2}$

د) $\lim_{n \rightarrow \frac{\pi}{2}} \frac{|\sin n|}{\sin 2n}$ $\xrightarrow{\text{مستقيم}}$ $\frac{-\sin n}{2 \sin n \cos n} = \frac{-1}{2 \cos n}$ $\xrightarrow{n=\frac{\pi}{2}}$ $\frac{-1}{2 \cdot 0} = \infty$

الف) $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{\cos n}$ $\xrightarrow{\text{مستقيم}}$ $\sqrt{0} = 0$

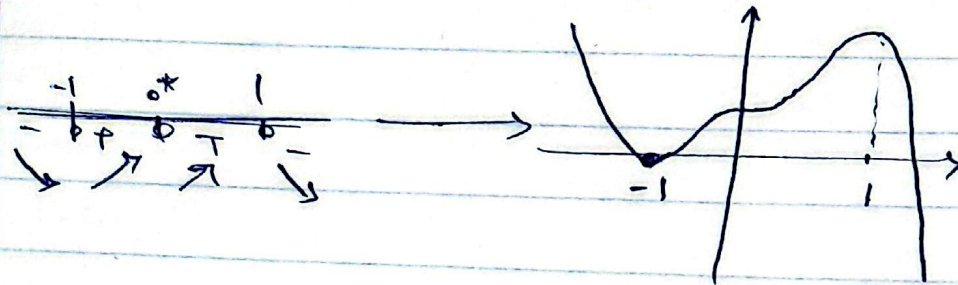
د) $\lim_{n \rightarrow 0} \sqrt{n - 2\sqrt{n}}$ $\xrightarrow{\text{مستقيم}}$ $\sqrt{0 - 2 \cdot 0} = 0$

الف) $\lim_{n \rightarrow 0^+} \frac{(-1)^{\lfloor \sin n \rfloor}}{n^2(n-1)}$ $\xrightarrow{\text{مستقيم}}$ $\frac{(-1)^0}{0^2(0-1)} = \frac{1}{0} = \infty$

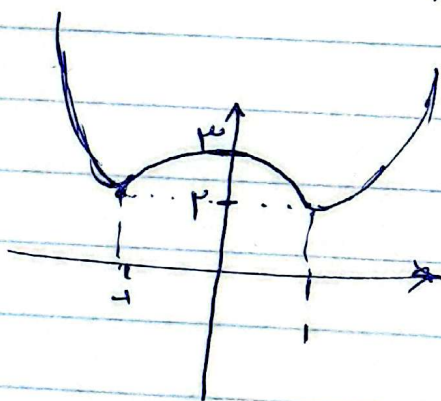
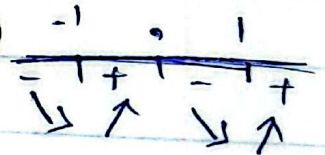
د) $\lim_{n \rightarrow 2} \frac{n^2 - [n^2]}{n - [n]}$ $\xrightarrow{\text{مستقيم}}$ $\frac{2^2 - [2^2]}{2 - [2]} = \frac{0}{0}$ $\xrightarrow{\text{ل'Hôpital}}$ $\frac{2n - 2[n]}{1 - 1} = \frac{0}{0}$ $\rightarrow \infty$

ج) $y = \omega a^x - \frac{\omega}{a^x} \Rightarrow y' = \omega a^x - \omega a^{-x} = \omega a^x (1 - a^{-2x})$

1.



ب) $y = a^x - \frac{1}{a^x} \Rightarrow y' = a^x + \frac{1}{a^x} = a^x (a^{2x} + 1)$



$y = 1 \Rightarrow x = 1$
 $y = 0 \Rightarrow x = 0$
 $y = -1 \Rightarrow x = -1$