

الف)  $\lim_{x \rightarrow 2^+} f_{n-2} = f_{2^+ - 2} = \omega$

ب)  $\lim_{x \rightarrow 2^-} f_{n-2} = f_{2^- - 2} = \omega$

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الف)  $\lim_{x \rightarrow 2^+} f[n] - 2 = f_{2^+ - 2} = \omega$

ب)  $\lim_{x \rightarrow 2^-} f[n] - 2 = f_{2^- - 2} = 1$

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الف)  $\lim_{x \rightarrow 2^+} [f_{n-2}] = [\omega^+] = \omega$

ب)  $\lim_{x \rightarrow 2^-} [f_{n-2}] = [\omega^-] = 2$

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الف)  $[\lim_{x \rightarrow 2^+} f_{n-2}] = [f_{2^+ - 2}] = \omega$

ب)  $[\lim_{x \rightarrow 2^-} f_{n-2}] = [f_{2^- - 2}] = \omega$

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الف)  $\lim_{x \rightarrow 2} \frac{f_{n-2}}{n-2} = \begin{cases} \lim_{x \rightarrow 2^+} \frac{f_{n-2}}{n-2} = \frac{q}{0^+} = +\infty \\ \lim_{x \rightarrow 2^-} \frac{f_{n-2}}{n-2} = \frac{q}{0^-} = -\infty \end{cases}$

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ب)  $\lim_{x \rightarrow 2} \frac{f_{n-2}}{(n-2)^2} = \begin{cases} \lim_{x \rightarrow 2^+} \frac{f_{n-2}}{(n-2)^2} = \frac{q}{0^+} = +\infty \\ \lim_{x \rightarrow 2^-} \frac{f_{n-2}}{(n-2)^2} = \frac{q}{0^-} = +\infty \end{cases}$

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$$\omega) \lim_{n \rightarrow r} \frac{f_{n-r}}{\sqrt{n-r}} = \begin{cases} \lim_{n \rightarrow r^+} \frac{f_{n-r}}{\sqrt{n-r}} = \frac{q}{\sqrt{0^+}} = +\infty \\ \lim_{n \rightarrow r^-} \frac{f_{n-r}}{\sqrt{n-r}} = \frac{q}{\sqrt{0^-}} = \text{O.L.} \end{cases} \quad \boxed{\text{جواب}} \quad \frac{1}{-1} \frac{r}{-1} \frac{r}{-1} \frac{r}{-1} \quad (5)$$

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$$\omega) \lim_{n \rightarrow r} \frac{f_{n-r}}{\sqrt{n^2 - 4n + 4}} = \begin{cases} \lim_{n \rightarrow r^+} \frac{f_{n-r}}{\sqrt{(n-r)^2}} = \lim_{n \rightarrow r^+} \frac{f_{n-r}}{n-r} = \frac{q}{\sqrt{0^+}} = +\infty \\ \lim_{n \rightarrow r^-} \frac{f_{n-r}}{\sqrt{n^2 - 4n + 4}} = \lim_{n \rightarrow r^-} \frac{f_{n-r}}{\sqrt{(n-r)^2}} = \frac{q}{\sqrt{0^-}} = \text{O.L.} \end{cases} \quad \boxed{\text{جواب}}$$

$$\omega) \lim_{n \rightarrow r} \frac{f_{n-r}}{n^2 - \sqrt{n+1}} = \begin{cases} \lim_{n \rightarrow r^+} \frac{f_{n-r}}{(n-r)(n-r)} = \frac{q}{0^+} = -\infty \\ \lim_{n \rightarrow r^-} \frac{f_{n-r}}{(n-r)(n-r)} = \frac{q}{0^+} = +\infty \end{cases} \quad \boxed{\text{جواب}} \quad \frac{r}{+} \frac{r}{-} \frac{r}{-} \frac{r}{+} \quad (5)$$

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$$\omega) \lim_{n \rightarrow r} \frac{f_{n-r}}{[n-r]} = \begin{cases} \lim_{n \rightarrow r^+} \frac{f_{n-r}}{[n-r]} = \frac{q}{0} = \text{O.L.} \\ \lim_{n \rightarrow r^-} \frac{f_{n-r}}{[n-r]} = \frac{q}{-1} = -q \end{cases} \quad \boxed{\text{جواب}}$$

$$\omega) \lim_{n \rightarrow r} [r_n] + [-r_n] = \begin{cases} \lim_{n \rightarrow r^+} [r_n] + [-r_n] = q + (-1) = r \\ \lim_{n \rightarrow r^-} [r_n] + [-r_n] = 1 + (-1) = r \end{cases} \quad \boxed{r} \leftarrow \text{جواب} \quad (5)$$

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$$\omega) \lim_{n \rightarrow -4} [-r_n] + [r_n] = \begin{cases} \lim_{n \rightarrow (-4)^+} [-r_n] + [r_n] = r + (-1r) = 11 \\ \lim_{n \rightarrow (-4)^-} [-r_n] + [r_n] = r + (-1r) = 11 \end{cases} \quad \boxed{11} \leftarrow \text{جواب}$$

$$\omega) \lim_{n \rightarrow r} [n^2 - f_n] = \begin{cases} \lim_{n \rightarrow r^+} [n^2 - f_n] = -f \\ \lim_{n \rightarrow r^-} [n^2 - f_n] = -f \end{cases} \quad \boxed{-f} \leftarrow \text{جواب} \quad (5)$$

$$\omega) \lim_{n \rightarrow r} [4n - x^2] = \begin{cases} \lim_{n \rightarrow r^+} [4n - x^2] = 1 \\ \lim_{n \rightarrow r^-} [4n - x^2] = 1 \end{cases} \quad \boxed{1} \leftarrow \text{جواب}$$

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$$\omega) \lim_{n \rightarrow r} \frac{|n-r|}{n^2 - 4n + 4} = \begin{cases} \lim_{n \rightarrow r^+} \frac{|n-r|}{n^2 - 4n + 4} = \lim_{n \rightarrow r^+} \frac{n-r}{(n-r)^2} = \frac{1}{n-r} = 1 \\ \lim_{n \rightarrow r^-} \frac{|n-r|}{n^2 - 4n + 4} = \lim_{n \rightarrow r^-} \frac{-(n-r)}{(n-r)^2} = \frac{-1}{n-r} = -1 \end{cases} \quad \boxed{\text{جواب}} \quad (5)$$

$$\omega) \lim_{n \rightarrow 1} \frac{n - [n]}{n^2 - 1} = \begin{cases} \lim_{n \rightarrow 1^+} \frac{n - [n]}{n^2 - 1} = \lim_{n \rightarrow 1^+} \frac{n-1}{(n-1)(n+1)} = \frac{1}{n+1} \\ \lim_{n \rightarrow 1^-} \frac{n - [n]}{n^2 - 1} = \lim_{n \rightarrow 1^-} \frac{n}{n^2 - 1} = \frac{1}{0^-} = -\infty \end{cases} \quad \boxed{\text{جواب}}$$

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