

$$۱) \lim_{n \rightarrow r^+} \frac{r(n)+d}{n+1} \rightarrow \frac{r(r^+)+d}{r^++1} = \frac{q^+}{r^++1} = \frac{p}{r^++1}$$

$$ب) \lim_{n \rightarrow r^-} \frac{r(n)+d}{n+1} \rightarrow \frac{r(r^-)+d}{r^-+1} = \frac{q^-}{r^-+1} = \frac{p}{r^-+1}$$

$$ج) \lim_{n \rightarrow r} \frac{r(n)+d}{n+1} \rightarrow \frac{r(r)+d}{r+1} = \frac{q}{r+1} = \frac{p}{r+1}$$

$$د) \lim_{n \rightarrow 0} \frac{r(n)+v}{[n^2]} \rightarrow \frac{r(0)+v}{[0^+]} = \frac{v}{0} = \text{تقریباً } \leftarrow \text{نقطه}$$

$$۲) \lim_{n \rightarrow r^+} f(n)-2 \rightarrow f(r^+)-2 = 4$$

$$ب) \lim_{n \rightarrow r^-} [f(n)-2] \rightarrow [f(r^-)-2] = [1.5] = 1$$

$$ج) \lim_{n \rightarrow r} [f(n)-2] \rightarrow f(r)-2 = 1.5 \rightarrow [1.5] = 1$$

$$د) \lim_{n \rightarrow r^+} [f(n)-2] \rightarrow f(r^+)-2 = 1.5 \rightarrow [1.5] = 1$$

$$۳) \lim_{n \rightarrow r^+} \frac{r^2(n)+1}{r} \rightarrow \frac{r^2(r^+)+1}{r} = \frac{r^2(r)+1}{r} = \frac{v}{r} = \frac{p}{r}$$

$$ب) \lim_{n \rightarrow r^-} \left[\frac{r^2(n)+1}{r} \right] \rightarrow \frac{r^2(r^-)+1}{r} = d^- - [d] = d$$

$$ج) \lim_{n \rightarrow r} \left[\frac{r^2(n)+1}{r} \right] \rightarrow \frac{r^2(r)+1}{r} = d \rightarrow d - [d] = d$$

1.) $\lim_{n \rightarrow r^+} \left[\frac{n-d}{n-r} \right] \rightarrow \frac{r(r^+)H}{r} = d^+ \xrightarrow{\lim} d - [d] = d$ ✓

9
10) $\lim_{n \rightarrow 1} \frac{n-d}{n^2-9n+d} \rightarrow$

11) $n=1 \rightarrow 1-4+d \in \mathbb{R} \rightarrow \text{no info}$

11) $\lim_{n \rightarrow 1^+} \frac{(n-d)}{(n-d)(n-1)} = \frac{1}{n-1} = \frac{1}{0^+} = +\infty$ ✓

12) $\lim_{n \rightarrow 1^-} \frac{(n-d)}{(n-d)(n-1)} = \frac{1}{n-1} = \frac{1}{0^-} = -\infty$ ✓

13) $\lim_{n \rightarrow r} \frac{n-r}{n^2-9n+9} \rightarrow$

14) $n=r \rightarrow 9-18+9 \in \mathbb{R} \rightarrow \text{no info}$

15) $\lim_{n \rightarrow r^+} \frac{n-r}{(n-r)^2} = \frac{n^+-r}{(n^+-r)^2} = \frac{-1^-}{0^+} = -\infty$ ✓

16) $\lim_{n \rightarrow r^-} \frac{n-r}{(n-r)^2} = \frac{n^--r}{(n^--r)^2} = \frac{-1^+}{0^+} = -\infty$ ✓

17) $\lim_{n \rightarrow -r} [-r(n)] - [d(n)] \rightarrow$

18) $\lim_{n \rightarrow -r^+} [-r(n)] - [d(n)] = 4 + 14 = 18$

19) $\lim_{n \rightarrow -r^-} [-r(n)] - [d(n)] = 11 + 18 = 29$

$$\lim_{n \rightarrow \infty} \left[\frac{-1}{n^2} \right] \rightarrow$$

$$\rightarrow \left(-\frac{1}{n} \right)^{-}$$

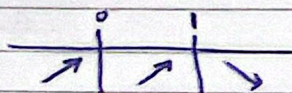
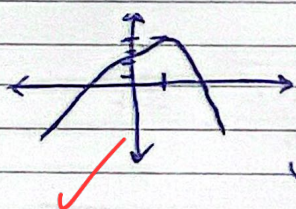
مختصه به این است که
نشان می‌دهد!

$$\left[\frac{-1}{\left(-\frac{1}{n} \right)^2} \right] = \left[\frac{-1}{\frac{1}{n^2}} \right] = [-n^2] = -\infty$$

$$4) \lim_{n \rightarrow \infty} [n^2 - n + 1] \rightarrow$$

صورت و مخرج را جدا می‌کنیم:

$$\lim_{n \rightarrow \infty} [n^2 - n + 1] = \infty \rightarrow \frac{n^2}{n^2} - \frac{n}{n^2} + \frac{1}{n^2} \rightarrow \frac{n^2(-n+1)}{n^2}$$



$$\begin{aligned} & \xrightarrow{\text{cancel}} \frac{n^2}{n^2} - \frac{n}{n^2} + \frac{1}{n^2} \rightarrow \frac{n^2}{n^2} = 1 \\ & \left[\frac{n^2}{n^2} \right] = 1 \end{aligned}$$

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

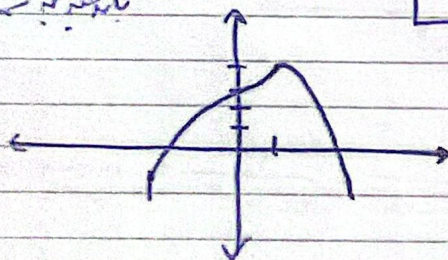
$$n \rightarrow \infty$$

$$\{0 - \infty + 1\}$$

$$\rightarrow \infty$$

$$\lim_{n \rightarrow \infty} [n^2 - n + 1] = \infty$$

نشان می‌دهد!



$$\rightarrow \frac{n^2}{n^2} = 1$$

$$\rightarrow \frac{n}{n^2} = \frac{1}{n}$$

$$\rightarrow \frac{1}{n^2} = \frac{1}{n^2}$$

$$6) \lim_{n \rightarrow \infty} \frac{n^2 - 1}{n^2 + 1} \rightarrow$$

$$n \rightarrow \infty$$

$$\frac{(n-1)(n+1)}{(n-1)(n+1)}$$

$$1, 10$$

$$n^+ = \frac{n^2 + n + 1}{n + 1} = \frac{n^2}{n} = n$$

$$n^- = \frac{-(n^2 + n + 1)}{n + 1} = \frac{-n^2}{n} = -n$$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

الف) $\lim_{n \rightarrow \infty} \frac{\sin n}{n}$

۸ $\lim_{n \rightarrow \infty} \frac{\sin n}{n} \rightarrow$

۹ $\lim_{n \rightarrow \infty} \frac{-\sin n}{n \sin n \cos n} = \frac{-1}{n \cos n} = \frac{-1}{-n} = \frac{1}{n}$

۱۰ $\lim_{n \rightarrow \infty} \frac{\sin n}{n \sin n \cos n} = \frac{1}{n \cos n} = \frac{1}{-n} = -\frac{1}{n}$

۱۲ $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{\cos n} \rightarrow \lim_{x \rightarrow \frac{\pi}{2}} \sqrt{\cos x} = 0$

۱۳ $\lim_{n \rightarrow \frac{\pi}{2}} \sqrt{\cos n} = 0$

۱۴ $\lim_{n \rightarrow 0} \sqrt{n - 2\sqrt{n}} \rightarrow \lim_{x \rightarrow 0} \sqrt{x - 2\sqrt{x}} = \sqrt{0 - 0} = 0$

۱۵ $\lim_{n \rightarrow 0} \sqrt{n - 2\sqrt{n}} = 0$

۱۶ $\lim_{n \rightarrow 0} \frac{(-1)^{[n]}}{n^n - n^r} \rightarrow$

۱۷ $\lim_{n \rightarrow 0} \frac{(-1)^{[n]}}{n^n - n^r} = \frac{-1}{n^n - n^r} = \frac{-1}{n^n - n^r} = \frac{-1}{0} = -\infty$

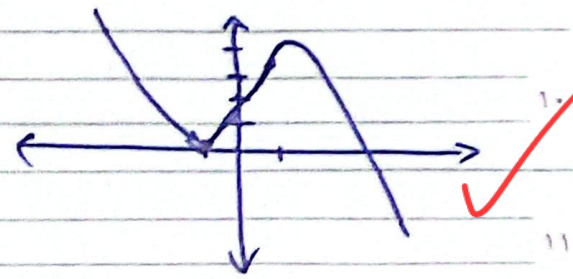
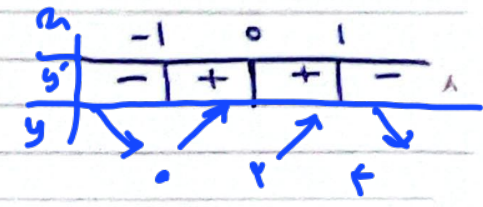
۱۸ $\lim_{n \rightarrow r} \frac{n^r - [n]}{n - [n]} \rightarrow \lim_{x \rightarrow r} \frac{x^r - [x]}{x - [x]} = \frac{(r - [r])}{(r - [r])} = \frac{r - [r]}{r - [r]} = 1$

۱۹ $\lim_{n \rightarrow 1} \frac{n^r - n}{n - 1} = \frac{r - 1}{r - 1} = \frac{1}{1} = 1$

۱۵) $y = 10n^3 - 3n^2 + 2 \rightarrow$

نتیجه: $10n^3 - 10n^2 = 10n^2(-n^2 + 1)$
 $\begin{matrix} \nwarrow & \swarrow \\ 0 & \pm 1 \end{matrix}$

$-1 \rightarrow -0 + 3 + 2 = 0$
 $1 \rightarrow 0 - 3 + 2 = -1$
 $0 \rightarrow 2$



۱۶) $y = n^3 - 3n^2 + 3n$

نتیجه: $n^3 - 3n^2 + 3n = n(n^2 - 3n + 3)$
 $\begin{matrix} \nwarrow & \swarrow \\ 0 & \pm 1 \end{matrix}$

$1 \rightarrow 1 - 3 + 3 = 1$
 $0 \rightarrow 0$
 $-1 \rightarrow 1 - 3 + 3 = 1$

