

$$(a^2 - r)^n \Rightarrow a^2 - r > 1 \Rightarrow a^2 > r \Rightarrow \underline{a > r \vee a < -r} \quad \text{الف}$$

1,5

$$(a^2 - r)^n \Rightarrow a^2 - r > 1 \Rightarrow a^2 > r \Rightarrow a > r \vee a < -r \quad \checkmark$$

$\cup \{ \pm \sqrt{r} \}$ $a^2 - r = 0 \rightarrow a = \pm \sqrt{r}$

6

0

7

$$n + \sqrt{n} - r = f(n) \rightarrow$$

تابع صعودی است.

0,5

$$D = n \geq 0 \cap f(0) = 0 \rightarrow n \geq 0$$

$$f(0) \leq f(\sqrt{n}) \Rightarrow f(n + \sqrt{n} - r) \leq f(\sqrt{n}) \Rightarrow n + \sqrt{n} - r \leq \sqrt{n}$$

$$\Rightarrow n - r \leq 0 \Rightarrow n \leq r \Rightarrow [1, 2] \text{ دودر}$$

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$$f(n) = \frac{r \sqrt{9 \cos^2 n - 1}}{r} - \frac{r \sqrt{1 - 9 \cos^2 n}}{r}$$

$$\rightarrow \cos_{\max} = 1 \Rightarrow \frac{r \sqrt{9 - 1}}{r} - \frac{r \sqrt{1 - 9}}{r} = \frac{r \sqrt{8}}{r} - \frac{r \sqrt{-8}}{r} = \frac{r \sqrt{8}}{r} - \frac{r \sqrt{8}}{r} = 0$$

$$\cos_{\min} = 0 \Rightarrow \frac{r \sqrt{9 - 1}}{r} - \frac{r \sqrt{1 - 9}}{r} = \frac{r \sqrt{8}}{r} - \frac{r \sqrt{-8}}{r} = \frac{r \sqrt{8}}{r} - \frac{r \sqrt{8}}{r} = 0$$

$$\left[-\frac{r}{r}, \frac{1}{r} \right] = R_f \quad \checkmark \rightarrow b - a = \frac{21}{2}$$

1,5

$$f(n) = n - [n] \cdot r \quad R_f = \left[\frac{r}{2}, \frac{r}{2} \right]$$

$$g(n) = \frac{r^n - r^{-n}}{r} \quad \begin{matrix} \text{max} \\ \text{min} \end{matrix} \rightarrow \frac{r^n - r^{-n}}{r} = \frac{n - \frac{1}{n}}{r} = \frac{8 - \frac{1}{8}}{r} = \frac{63}{8r}$$

$$R = [-2, -1]$$

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چون راحت نیست بعد نصف نموده رادارم