

۱۹ مهر

$D_f =$

$$n + 4\sqrt{n-2} \geq 0 \rightarrow [\varepsilon, +\infty)$$

$$D_g = [4, +\infty) \xrightarrow{n \geq 1} [1, +\infty)$$

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$D_f =$

$$D_f = R - \{3, 1\}$$

$$f(n) \xrightarrow{n=2} \frac{2+2}{\varepsilon-1+3} = \frac{\varepsilon}{-1} = -\varepsilon$$

$$\frac{g}{f} = \left\{ \left(2, \frac{-1}{\varepsilon} \right) (0, 4) \right\}$$

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$$f(n) \xrightarrow{n=0} \frac{2}{3}$$

الف) $f(2n) = \left\{ \left(\frac{1}{2}, 2 \right) \left(\frac{3}{2}, -1 \right) \left(\frac{5}{2}, 2 \right) \left(\frac{7}{2}, 4 \right) \right\}$ $n^2=1 \rightarrow n=\pm 1$
 $n^2=4 \rightarrow n=\pm 2$ $n^2=9 \rightarrow n=\pm 3$
 ب) $f(n^2) = \left\{ (1, 2) (\sqrt{3}, -1) (2, 2) (\sqrt{5}, 4) \right\} \rightarrow \left\{ (1, 2) (\sqrt{3}, -1) (2, 2) (\sqrt{5}, 4) \right\}$
 ج) $2g(n) = \left\{ (-2, 18) (1, 2) (3, 8) (-1, 0) \right\} + 1 \rightarrow \left\{ (-2, 19) (1, 3) (3, 9) (-1, 1) \right\}$

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د) $2f = \left\{ (1, \varepsilon), (3, -\varepsilon), (\varepsilon, \varepsilon), (-1, 4) \right\}$
 $\xrightarrow{g} = \left\{ (1, -\varepsilon), (3, -1), (-1, \frac{4}{\varepsilon}) \right\} = \left\{ (1, -\varepsilon), (3, -1), (-1, 4) \right\}$

$$2f = \left\{ (2, 2) (2, 2) (4, 18) (-2, 0) \right\}$$

$$h = 2f + g = \left\{ (2, \omega) (3, \omega) (-2, \omega) \right\}$$

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$$\sqrt{3n} - n \geq 0$$

$$\sqrt{3n} \geq n \rightarrow \sqrt{3n} \geq n \rightarrow \sqrt{3n} \geq n \rightarrow \sqrt{3n} \geq n$$

$$3n \geq n^2$$

$$n - n^2 \geq 0 \rightarrow n(1-n) \geq 0$$

$$g(n) = [n] + [-n] \begin{cases} n \in \mathbb{Z} & 0 \rightarrow \text{مجموعه اعداد صحیح} \\ n \notin \mathbb{Z} & 1 \rightarrow \text{مجموعه اعداد صحیح} \end{cases}$$

$$\frac{f}{g+1} = \left\{ \left(\frac{1}{2}, 2 \right) \right\}$$

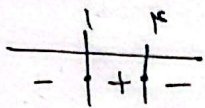
باید اعداد صحیح بین
 $\{0, 1, 2, 3\}$ انتخاب کنیم!

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$$\frac{0}{-1} + \frac{3}{1} \rightarrow [0, 3] - \{2\}$$

$$-(n^2 - 2n + 4) \geq 0$$

$$-(n-4)(n-1) \geq 0$$



$$D_f = [1, 4]$$

$$h = \frac{f}{g} = \left\{ (1, 0), (2, \frac{\sqrt{2}}{2}), (4, 0) \right\}$$

مقادیر د: 1, 2, 4

$$f(n) \xrightarrow{n=1} \sqrt{1-1-4} = 0$$

$$f(n) \xrightarrow{n=2} \sqrt{1-4-4} = \sqrt{2}$$

$$f(n) \xrightarrow{n=4} \sqrt{1-16-4} = 0$$

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الف) $y = n^3 - 3n^2 + 3n - 1$

$$y-1 = n^3 - 3n^2 + 3n - 1$$

$$y-1 = (n-1)^3 \rightarrow$$

$$n-1 = \sqrt[3]{y-1}$$

$$n = \sqrt[3]{y-1} + 1$$

$$R_f = \mathbb{R}$$

ب) $y = \frac{1}{n^2 - 2n}$ با فرض $y \neq 0$ معادله درجه 2 فرض کردیم!

$$n^2 y - 2n y = 1 \rightarrow y(n^2) - 2y(n) - 1 = 0$$

$$0 - 0 - 1 = 0 \quad \times$$

$$n = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0$$

$$4y^2 + 4(y) \geq 0 \quad \begin{array}{c} -1 \quad 0 \\ + \quad - \quad + \end{array}$$

$$4y(y+1) \geq 0 \quad R_f = (-\infty, -1] \cup [0, +\infty)$$

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الف) $\begin{cases} -\frac{b}{2a} = \frac{4}{2} = 2 \\ y = 4 \end{cases}$

$$a > 0$$

$$R_f = [4, +\infty)$$

ب) $\begin{cases} x_{\max} = -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ y_{\max} = 12 \end{cases}$

$$a < 0$$

$$R_f = (-\infty, 12]$$

ج) $\begin{cases} x_{\min} = -\frac{b}{2a} = \frac{4}{2} = 2 \\ y_{\min} = -4 \end{cases}$

$$a > 0$$

$$R_f = [-4, +\infty)$$

$$[0, +\infty)$$

د) $\begin{cases} x_{\max} = -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ y_{\max} = 9 \end{cases}$

$$a < 0$$

$$R_f = (-\infty, 9]$$

$$[0, 3] \quad \text{حاصل}$$

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الف) $\rightarrow R_f = \mathbb{R}$ بزرگترین توان قدر است

ب) $\rightarrow R_f = \mathbb{R}$ بزرگترین توان قدر است

ج) $\rightarrow \sqrt{R} \rightarrow [0, +\infty)$ حاصل

$$R_f = (R)^r = \sqrt[r]{R}$$

حاصل

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الف) تابع صعودی

$$R_f = R - \left\{ \frac{a}{c} \right\}$$

$$R_f = R - \{3\}$$

ب) تابع صعودی

$$R_f = R - \left\{ \frac{a}{c} \right\}$$

$$R_f = R - \{2\}$$

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$$f(n) = \sqrt{x-4+4\sqrt{n-4}+4} = \sqrt{(\sqrt{n-4}+2)^2} = |\sqrt{n-4}+2| = \sqrt{n-4}+2 \quad (1)$$

$$g(n) = \sqrt{x-4-4\sqrt{n-4}+4} = \sqrt{(\sqrt{n-4}-2)^2} = |\sqrt{n-4}-2| \xrightarrow{n \geq 8} \sqrt{n-4}-2$$

$$f(n)+g(n) = \sqrt{n-4}+2+\sqrt{n-4}-2 = 2\sqrt{n-4} \xrightarrow{\begin{matrix} a=0 \\ b=2 \\ c=-4 \end{matrix}} \frac{a+b}{c} = \frac{2}{-4} = -\frac{1}{2}$$

$$f(2n) = \left\{ \left(\frac{1}{2}, 2\right) \left(\frac{3}{2}, -1\right) (2, 2) \left(-\frac{1}{2}, 4\right) \right\} \quad n \text{ های } f \text{ باید حقیقی باشند!} \quad (2)$$

$$f(5) = \left\{ (1, 2) (-1, 2) (\sqrt{3}, -1) (-\sqrt{3}, -1) (2, 2) (-2, 2) \right\} \quad \text{هرگاه } n \text{ های } f \text{ را برابر } n^2 \text{ قرار دهیم!}$$

$$2g(n)+1 = \left\{ (-2, 19) (1, 3) (3, 9) (-1, 1) \right\} \quad \text{این عمل روی } n \text{ های } g \text{ اعمال می شود!}$$

$$\frac{2f}{g} = \left\{ \left(1, \frac{2 \times 2}{-1}\right) \left(3, \frac{2 \times -1}{2}\right) \left(-1, \frac{2 \times 4}{-2}\right) \right\} = \left\{ (1, -4) (3, -1) \right\}$$

$$Dh = Df \cap Dg \rightarrow Dh = \{2, -2, 3\} \quad (3)$$

$$h(n) = 2f(n) + g(n) \rightarrow h = \{(2, 5) (-2, 4) (3, 5)\}$$

$$f(n) = \frac{\sqrt{\sqrt{3n}-n}}{n-2} \rightarrow \begin{cases} n \neq 2 \\ n \geq 0 \end{cases} (\sqrt{3n}) \rightarrow Df = [0, 3] - \{2\} \quad (4)$$

$\sqrt{3n}-n \geq 0 \rightarrow 3n \geq n^2 \rightarrow 0 \leq n \leq 3$

$$g(n)+1 \neq 0 \rightarrow g(n) \neq -1 \rightarrow [n] + [-n] \neq -1 \rightarrow n \in \mathbb{Z}$$

$$D \frac{f}{g+1} = \left\{ Df \cap Dg, g(n) \neq -1 \right\} = \left\{ 0, 1, 3 \right\}$$

$[0, 3] - \{2\} \cap \mathbb{Z}$

(الف) $y = n^3 - 3n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1$ (v)

$$y-1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow n = \sqrt[3]{y-1} + 1$$

$R_f = \mathbb{R}$

(ب) $y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2n y = 1 \rightarrow n^2 y - 2n y - 1 = 0$

$y \neq 0 \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{0}{+}$

$y = 0 \rightarrow 0 = 1 \times$ صفتی وجود ندارد! $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$