

$D_f =$

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

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

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

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

$$ب) f(n^2) = \left\{ (1, 2) (\sqrt{3}, -1) (2, 2) \left(\frac{2}{\sqrt{3}}, 4 \right) \right\} \rightarrow \left\{ (1, 2) (\sqrt{3}, -1) (2, 2) \right\}$$

$$ج) 2g(n) = \left\{ (-2, 18) (1, 2) (2, 8) (-1, 0) \right\} + 1 \rightarrow \left\{ (-2, 19) (1, 3) (2, 9) (-1, 1) \right\}$$

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

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

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

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

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

$$3n \geq n^2$$

$$3n - n^2 \geq 0 \rightarrow n(3-n) \geq 0$$

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

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

$$\frac{f}{g+1} = \left\{ (0, 0) \right\}$$

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

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

$$\begin{array}{c} 1 \quad 1 \\ - \quad + \quad - \end{array}$$

$$D_f = [1, 4]$$

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

$$D: 1, 2, 4$$

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

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

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

$$الف) y = n^3 - 3n^2 + 3n - 1$$

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

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

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

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

$$R_f = \mathbb{R}$$

$$ب) y = \frac{1}{n^2 - 2n}$$

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

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

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

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

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

$$a > 0$$

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

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

$$a < 0$$

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

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

$$a > 0$$

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

$$[0, +\infty)$$

$$د) \begin{cases} x_{\max} = \frac{-b}{2a} = \frac{-9}{-2} = 4.5 \\ y_{\max} = 9 \end{cases}$$

$$a < 0$$

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

$$[0, 3] \quad \text{جواب}$$

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

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

$$ج) \text{بزرگترین توان قدر است} \rightarrow \sqrt{R} \rightarrow [0, +\infty) \quad \text{جواب}$$

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

$$الف) \text{تابع صعودی است}$$

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

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

$$ب) \text{تابع صعودی است}$$

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

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