

→ راجع به

۱۹۷۵ آفرین

۱)

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

$$g(n) = \sqrt{n - \epsilon \sqrt{n - \epsilon}}$$

$$g(n) = \sqrt{n - \epsilon \sqrt{n - \epsilon}} = \sqrt{n - \epsilon \sqrt{n - \epsilon - \epsilon + \epsilon}}$$

$$= \sqrt{(\sqrt{n - \epsilon} - \epsilon)^2} = |\sqrt{n - \epsilon} - \epsilon|$$

با بساز
روش

$$f(n) = |\sqrt{n - \epsilon} + \epsilon|$$

$$g(n) + f(n) = |\sqrt{n - \epsilon} - \epsilon| + |\sqrt{n - \epsilon} + \epsilon|$$

برای ϵ کوچک
عبارت مثبت

$$= 2\sqrt{n - \epsilon} = a + b\sqrt{n + c}$$

$$\begin{aligned} a &= 0 \\ b &= 2 \\ c &= -\epsilon \end{aligned}$$

$$\frac{a+b}{c} = \frac{2}{-\epsilon} = -\frac{2}{\epsilon}$$

۲)

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

$$D_f = \mathbb{R} - \{\epsilon, 1\}$$

$$D_f \cap D_g = \{n \mid f(n) = 0\} = \{\epsilon, 0\}$$

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

$$f(n) = \{(1, 2), (3, -1), (5, 2), (-1, 4)\}$$

$$g(n) = \{(-2, 0), (1, -1), (3, 2), (-1, 0)\}$$

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

$$f(n^2) = \{(1, 2), (\sqrt{2}, -1), (2, 2), (-1, 2), (-\sqrt{2}, -1), (-2, 2)\}$$

$$2) \quad g^2(n) = \{(-2, 0), (1, 0), (3, 0), (-1, 0)\}$$

$$1) \quad \frac{f}{g} = \{(1, -2), (3, -1), \text{...}\}$$

$$f(n) = \{(2, 2), (0, 1), (5, 4), (-2, 0)\}$$

$$g(n) = \{(0, 1), (2, 0), (-2, 4), (-1, 2), (3, 2)\}$$

$$h = f + g$$

$$h = \{(2, 0), (2, 0), (-2, 4)\}$$

د ۱

$$f(n) = \frac{\sqrt{r^n - n}}{n - r}$$

$$g(n) = [n] + [-n]$$

$(\frac{f}{g+1}) | n$ $= \{ (0, 0), (1, -\sqrt{r-1}), (r, 0) \}$

$D_f \cap D_g = \{ n \mid f(n) \neq 0, g(n) = -1 \} = \{ 0, 1, r \}$

$D_f = [0, r] - \{ r \}$

$g(n) = R$

$n \geq 0$

$g(n) \neq -1$

$n \neq 0$

$n \in \mathbb{Z}$

$\sqrt{r^n - n} \geq 0$

$\sqrt{r^n} \geq n$

$n \geq 0 \cup r \downarrow$

$\forall n \geq r \rightarrow n^r - rn \leq 0$

$n(n-r) \leq 0$

$\frac{0}{r} \leq \frac{r}{r}$

د ۲)

$f(n) = \sqrt{\omega n - n^r - 1}$

$g(n) = \{ (1, r), (r, r), (r, r), (\omega, 1) \}$

$h(n) = \frac{f(n)}{g(n)}$

$D_f \cap D_g = \{ n \mid \omega n - n^r - 1 \geq 0, n^r - \omega n + 1 \leq 0 \} \rightarrow (n-1)(n-1) \leq 0$

$\frac{1}{r} \leq \frac{r}{r}$

$$D_f A D_g = \{1, 2, 4\}$$

$$h(n) = \{ (1, 0), (2, \frac{1}{2}), (4, 0) \}$$

v)

$$y = n^r - rn^r + rn + 1 - 1$$

$$y = (n-1)^r + 1$$

$$y-1 = (n-1)^r \rightarrow y \in \mathbb{R} \rightarrow \mathbb{R}_f = \mathbb{R}$$

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

$$y = \frac{1}{n^r - rn}$$

بیشتر. $y \neq 0$ عبارت!

درجه ۲ فرض کردیم!

(1, 1/5)

$$yn^r - rny = 1 \rightarrow yn^r - rny - 1 = 0$$

$$y \neq 0$$

$$\Delta \geq 0$$

$$y = 0 \rightarrow 0 = 1 \times \quad 2y^r + 4y \geq 0$$

$$y(y+1) \geq 0$$

$$\frac{-1 \pm \sqrt{1+4}}{2}$$

$$\mathbb{R}_f = (-\infty, -1] \cup (0, +\infty)$$

$y \neq 0$

$$(وژدور) \quad y = \frac{1}{n^r - rn} \rightarrow n^r - rn = \frac{1}{y}$$

بر دو طرف

$$\frac{y_r}{y} \geq 0$$

$$\frac{-1 \pm \sqrt{1+4}}{2}$$

$$n^r - rn + 1 = \frac{y+1}{y}$$

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

$$\mathbb{R}_f = (-\infty, -1] \cup (0, +\infty)$$

$y \neq 0$

ا)

$$y = n^2 - 4n + 1$$

$$a > 0 \rightarrow \min |r| \rightarrow \mathbb{R}_f = [4, +\infty)$$

ب) $y = -n^2 + 4n + 7$

$$a < 0 \rightarrow \max |r| \rightarrow \mathbb{R}_f = (-\infty, 12]$$

ج) $y = \sqrt{n^2 - 2n - 3}$

$$n^2 - 2n - 3 \rightarrow a > 0 \rightarrow \min |r|$$

$$\downarrow [-1, +\infty) \rightarrow \mathbb{R}_f = [0, +\infty)$$

بخط رادیکال

د)

د) $y = \sqrt{4n^2 - n^2}$

$$4n^2 - n^2 \rightarrow a < 0 \rightarrow \max |a|$$

$$\downarrow [-\infty, 9] \rightarrow \mathbb{R}_f = [0, 3]$$

بخط رادیکال

ه)

ه) $y = n^2 - 2n^2 + 2n + 1$

$$\mathbb{R}_f = \mathbb{R}$$

و) $y = n^2 - 4n^2 + 2n + 7$

$$\mathbb{R}_f = \mathbb{R}$$

$$2) y = \sqrt{n^2 - 4n^2 + \omega n + 1}$$

$$\mathbb{R} \quad \underbrace{n^2 - 4n^2 + \omega n + 1}_{\substack{\downarrow \\ n^2 - 4n^2 + \omega n + 1}} \xrightarrow{\text{دایره}} \mathbb{R}$$

$$R_f = [0, +\infty)$$

$$3) y = (n^2 - 4n^2 + \omega n + 1)^2$$

$$n^2 - 4n^2 + \omega n + 1 \xrightarrow{\text{دایره}} \mathbb{R}$$

$$R_f = [0, +\infty)$$

1.1

$$الف) y = \frac{n+1}{n-2}$$

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

$$ب) y = \frac{n+1}{n-1}$$

$$R_f = \mathbb{R} - \{1\}$$

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

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

$$y = 0 \rightarrow 0 = 1 \quad x \text{ صفتی وجود ندارد!} \rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$$