

$$\rightarrow \frac{Df}{g+1} = \{0, 1, \dots, n\}$$

$$f(x) = \sqrt{1-x-x^2} \Rightarrow \text{م. } \{0, 1\} \text{ و } \{x, y\} \Rightarrow (x, y) \in (x, 0)$$

$$g(x) = \{(0, 1), (1, 0), (x, 0)\}$$

$$\frac{f(x)}{g(x)} = \frac{\sqrt{1-x-x^2}}{x} = \frac{\sqrt{x}}{x}$$

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

(9)

1, 1.5

$$y(n) = n^2 - 2n + 1 \Rightarrow n^2 - 2n + 1 = (n-1)^2 \Rightarrow y+1 = (n-1)^2$$

$$\sqrt{y+1} = n-1 \Rightarrow n = 1 + \sqrt{y+1} \quad (R)$$

$$y+1 = (n-1)^2$$

1.5

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

$$y(n) = n^2 - 2n + 1 \Rightarrow n = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 - 4(1)(1)}}{2(1)} = 1$$

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$$f(2n) = \left\{ \left(\frac{1}{2}, 2\right) \left(\frac{3}{2}, -1\right) (2, 2) \left(-\frac{1}{2}, 4\right) \right\} \quad \text{ن های } f \text{ باید حتماً برابر ۲ شوند!} \quad (۳)$$

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

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

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

$$f(n) = \frac{\sqrt{\sqrt{3n} - n}}{n - 2} \rightarrow \begin{cases} n \neq 2 \\ n > 0 \end{cases} \quad (\sqrt{3n}) \rightarrow Df = [0, 3] - \{2\} \quad (۵)$$

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

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

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

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

$$Df \rightarrow 5n - n^2 - 2 > 0 \rightarrow n^2 - 5n + 2 < 0 \rightarrow 1 \leq n \leq 4 \quad (۶)$$

$$Df \cap Dg = \{ 1, 2, 3 \}$$

$$\frac{f}{g} = h = \left\{ (1, 0) \left(2, \sqrt{\frac{2}{2}}\right) (3, 0) \right\}$$

(الف) $y = n^3 - 2n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1$ (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) $y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2ny = 1 \rightarrow n^2 y - 2ny - 1 = 0$

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

$y = 0 \rightarrow 0 = 1 \times$ صيغتين وجدنا رد! $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$

٨ - الف) $y = n^2 - 2n + 1 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 + 1 = 0 \end{cases} \rightarrow R_f = [0, +\infty)$

٨ - ب) $y = -n^2 + 4n + 3 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = -9 + 16 + 3 = 10 \end{cases} \rightarrow R_f = (-\infty, 10]$

٨ - ج) $y = n^2 - 2n - 3 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 - 3 = -4 \end{cases} \rightarrow R_f = \sqrt{[-4, +\infty)} = [-4, +\infty)$

٨ - د) $y = 4n - n^2 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = 8 - 4 = 4 \end{cases} \rightarrow R_f = \sqrt{(-\infty, 4]} = (-\infty, 4]$