

19, 25

دوسا صادق زاده ریاضی هند A

سوال ۱ الف $f = \{ (3, 2), (n, 2), (3, n-2), (m, 2), (-1, 2) \}$

نقشه $n^2 - n = 2 \rightarrow n^2 - n - 2 = 0 \rightarrow \begin{cases} n = -1 \\ n = 2 \end{cases}$ $\rightarrow$ باید دلیل (-1, 2) بیاید

$(3, n-2) \xrightarrow{n=2} (3, 2) = (m, 2) \Rightarrow m = 3$

$f = \{ (-1, 2), (1, 2), (2, 3), (a, m-1), (a+2, n), (m, 3) \}$
 $a = -1 \quad m = 2$

سوال ۲ $f(n) = \begin{cases} 3n-1; & n \geq 1 \\ n+a; & n < 1 \end{cases}$
 $n=2$
 $\rightarrow$ بیاید $a = 1$
 $\Rightarrow a \in (-\infty, 1]$

سوال ۳ $f(n) = \begin{cases} 3n-1; & n \geq 1 \\ an+a-1; & n < 0 \end{cases}$
 $a \in \mathbb{R}$
 $\xrightarrow{n=0} a-1 < 2 \rightarrow a < 3 \rightarrow a \in \mathbb{R}$

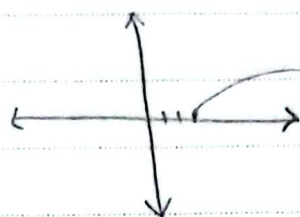
سوال ۴ $y = n^2 + 2$ $\xrightarrow{a \in \mathbb{R}}$ $\rightarrow$ بیاید

$x = y^2 + 2 \rightarrow y = \sqrt{x-2}$
 $y = n^2 - 2n + 2$ $\xrightarrow{a \in \mathbb{R}}$ $\rightarrow$ بیاید

$\min \begin{cases} 2 \\ -2 \end{cases}$

Arman

الف) $y = \sqrt{n-3}$



بدليل

سوال 4

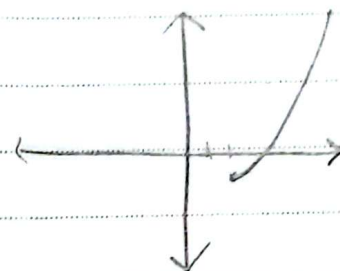
$n = \sqrt{y-3}$

$y = n^2 + 3$

ب) $y = n^2 - \varepsilon n + 3 \quad n \in [2, +\infty)$

min $\left| -\frac{b}{2a} = 2 \right.$

$\varepsilon - n + 3 = -1$



بدليل

2

$n = y^2 - \varepsilon y + 3 \rightarrow y^2 - \varepsilon y + 3 = n$

$y = \frac{\varepsilon \pm \sqrt{14 - 12n}}{2} = \frac{\varepsilon \pm \sqrt{4 + 12n}}{2} = 2 \pm \sqrt{n+1} = y \rightarrow D_{f(n)} = R_{f(n)}$

منه في قابل قبول است چون جرد دامنه است

$\Rightarrow y = 2 + \sqrt{n+1}$

$y = \frac{\varepsilon n + 1}{n-2}$



بدليل

سوال 5

$n = \frac{\varepsilon y + 1}{y-2} \rightarrow ny - 2n = \varepsilon y + 1 \rightarrow ny - \varepsilon y = 2n + 1$

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

$y = \frac{2n+1}{n-2}$

2

$\frac{2n+1}{n-2} = 2$

$\frac{2(n+1)}{(n+1)} = 2$

$\frac{2n+1}{n-2} = 2$

$$f(n) = n + \sqrt{n} \rightarrow f(n)^{-1} = an + b - \sqrt{n} - c \quad (\text{سوال 1})$$

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

$$\rightarrow \sqrt{y} + \frac{1}{\varepsilon} = \sqrt{n + \frac{1}{\varepsilon}} = \sqrt{y} = \sqrt{n + \frac{1}{\varepsilon}} - \frac{1}{\varepsilon}$$

$$\xrightarrow{\text{طرف}} y = n + \frac{1}{\varepsilon} + \frac{1}{\varepsilon} - \sqrt{n + \frac{1}{\varepsilon}} = n - \sqrt{n + \frac{1}{\varepsilon}} + \frac{1}{\varepsilon}$$

$$a + b + c = 1$$

$$\Rightarrow a = 1 \quad b = \frac{1}{\varepsilon} \quad c = -\frac{1}{\varepsilon}$$

(ن اول)

$$y = \frac{n}{\sqrt{n^2 - 1}}$$

$$y = \frac{n_1}{\sqrt{n_1^2 - 1}}$$

$$y = \frac{n_2}{\sqrt{n_2^2 - 1}}$$

$$\rightarrow \frac{n_1}{\sqrt{n_1^2 - 1}} = \frac{n_2}{\sqrt{n_2^2 - 1}}$$

$$\xrightarrow{\text{طرف}} \frac{n_1}{\sqrt{n_1^2 - 1}} = \frac{n_2}{\sqrt{n_2^2 - 1}} \Rightarrow n_1^2 n_2^2 - 1 n_1^2 = n_1^2 n_2^2 - 1 n_2^2$$

$$\Rightarrow n_1^2 = n_2^2 \Rightarrow n_1 = \pm n_2 \rightarrow \text{چون } n_1, n_2 \in \mathbb{N} \Rightarrow n_1 = n_2$$

$$\Rightarrow n_1 = n_2 \Rightarrow \text{و نه}$$

$$n = \frac{y}{\sqrt{y^2 - 1}} \xrightarrow{\text{طرف}} n^2 = \frac{y^2}{y^2 - 1} \Rightarrow n^2 y^2 - 1 n^2 = y^2$$

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

$$= y^2 = \frac{1 n^2}{n^2 - 1}$$

$$\rightarrow y = \pm \sqrt{\frac{1 n^2}{n^2 - 1}} = \pm \frac{n \sqrt{1}}{\sqrt{n^2 - 1}} \xrightarrow{\text{طرف}} y = \frac{n \sqrt{1}}{\sqrt{n^2 - 1}}$$

Arman

$$f^{-1}(n) = \frac{n}{1+|n|} \quad g(n) = \sqrt{n} - 1$$

(9/12)

$$f\left(-\frac{r}{s}\right) + g^{-1}\left(-\frac{r}{s}\right) = -\frac{r}{s} + \frac{q}{rs} = \frac{-s + r}{rs} = \frac{-r}{rs}$$

$$y = \frac{n}{1+|n|} \rightarrow f(n) \rightarrow n = \frac{y}{1+|y|} \Rightarrow n + |y| = y$$

$$y \geq 0: y(n+1) = -n \Rightarrow y = \frac{n+1}{1-n}$$

$$y < 0: y + yn = n \rightarrow y(1+n) = n \Rightarrow y = \frac{n}{n+1}$$

(5)

$$f(n) = \begin{cases} \frac{n}{1-n} & n \geq 0 \\ \frac{n}{n+1} & n < 0 \end{cases} \quad f\left(-\frac{r}{s}\right) = -\frac{r}{s}$$

$$g^{-1}(n) \Rightarrow n = \sqrt{y} - 1 \quad n+1 = \sqrt{y} \rightarrow y = (n+1)^2$$

$$= y = \frac{q}{rs}$$

$$f^{-1}(n) = \sqrt{n-1} \quad g(n) = f(n) + \sqrt{f(n)} \quad g^{-1}(12) = 1.012$$

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

$$g(n) = n^3 + 1 + \sqrt{n^3 + 1} \xrightarrow{g(n)} n = y^3 + 1 + \sqrt{y^3 + 1}$$

$$\rightarrow n = t^3 + t \rightarrow t = \frac{-1 \pm \sqrt{1+4n}}{2} \xrightarrow{t \geq 0} t = \frac{\sqrt{4n+1}-1}{2}$$

$$\rightarrow \sqrt{y^3+1} = \frac{\sqrt{4n+1}-1}{2} \xrightarrow{r \text{ odd}} r y^3 + 1 = \frac{4n+1 - r\sqrt{4n+1}}{r}$$

Arman

$$y_{n+1} = \frac{y_n - \sqrt{\varepsilon_{n+1}} + 1}{r} \Rightarrow y^* = \frac{y_n - \sqrt{\varepsilon_{n+1}} - 1}{r}$$

1. nbi

$$\Rightarrow y = \sqrt{\frac{y_n - \sqrt{\varepsilon_{n+1}} - 1}{r}} \xrightarrow{g(1/2)} y = \sqrt{\frac{y^2 - \sqrt{\varepsilon} - 1}{r}} = \sqrt{\frac{14}{r}} = 2$$

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