

تکلیف (8 سر 100)

بنام (10)

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$$f(x) = \begin{cases} x^2 + 2x & ; x \geq 0 \\ 2x - 4 & ; x < 0 \end{cases} \quad (1)$$

$$x^2 + 2x = 2x - 4$$

$$x^2 + 2x = 2x - 4 \Rightarrow 2x = -4 \Rightarrow x = -2 \quad (2)$$

$$g(x) = 2x + b \quad , \quad f(x) = \frac{x^2 + a}{2x - b} \quad (3)$$

$$g(2) = 2x + b \Rightarrow 2 + b = 2 \Rightarrow b = -1 \quad \text{ف } f(1) \text{ مقدار}$$

$$f(2) = \frac{2^2 + a}{2 \cdot 2 - (-1)} = \frac{4 + a}{5} = \frac{4 + a}{5} = 2 \Rightarrow 4 + a = 10$$

$$a = 6$$

$$f(1) = \frac{1 + 6}{2 - (-1)} = \frac{7}{3} = \text{عدد}$$

$$\mathbb{R} - \{-6\} \quad \text{دامنه آن} ; f(x) = \frac{x^2 + 1}{2x^2 + 2x + b} \quad (4)$$

$$f(1) \text{ مقدار}$$

$$2x^2 + 2x + b = 0 \Rightarrow -6 \text{ ریشه}$$

$$2 - 2 + b = 0 = 2 + 2a + b$$

$$-2a = 2 \Rightarrow a = -1$$

$$2 - (-1) + b = 0 \Rightarrow b = -3$$

$$f(x) = \frac{x^2 + 1}{2x^2 - 2x - 3} = \frac{10}{12}$$

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$\mathbb{R} - \{ -1 \}$ جواب آن $f(x) = \frac{x^m - \sqrt{m}}{-x^m + ax + b}$ (۱)

و $a+b = -1$ (۲)

$-x(x+1)^2 = 0 \Rightarrow -x^3 - 2x^2 - x = 0 \Rightarrow x^3 + 2x^2 + x = 0$

$\Rightarrow a+b = -1$ (۳)

$\mathbb{R} - \{ 1 \}$ آن جواب $f(x) = \frac{2x}{(x-1)(x^2+mx+1)}$ (۴)

$-1 < m < 1$ (مربعه) $\Rightarrow m$ در $(-1, 1)$

$x^2 + mx + 1 \Rightarrow m = -2$ (۲)

اگر $x^2 + mx + 1$ ریشهی حقیقی نداشته باشد:

$\Delta < 0 \Rightarrow m^2 - 4 < 0 \Rightarrow m^2 < 4 \Rightarrow -2 < m < 2$ (۳)

$f(x) = \sqrt{x - \frac{1}{2x}}$ (۴)

$x - \frac{1}{2x} \geq 0 \Rightarrow x \geq \frac{1}{2x} \Rightarrow 2x^2 \geq 1$

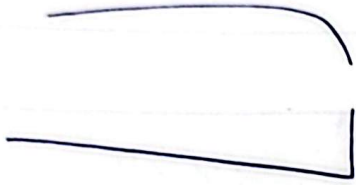
$Df = \mathbb{R} - (-\frac{1}{\sqrt{2}}; \frac{1}{\sqrt{2}}) \Rightarrow \frac{1}{\sqrt{2}} \leq x$ (۲)

$x \leq -\frac{1}{\sqrt{2}}$

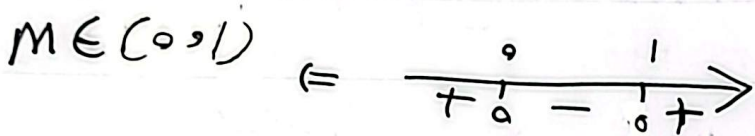
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؟ IR راسه ی آن $f(x) = \sqrt{mx^2 + 2mx + 1}$ (✓)

$mx^2 + 2mx + 1 \geq 0 \rightarrow \begin{cases} \Delta \leq 0 \\ m > 0 \rightarrow \text{منبسط} \end{cases}$ $R \text{ نوبت } f(x) = 1 \leftarrow \text{نقطه } m = 0$
 $m \in [0, \infty)$



راسه برابر IR
 $\Delta \leq 0$
 $m^2 - 4m < 0$
 $m(m-4) < 0$
 $m \in (0, 4)$



؟ $a+k$ - $\frac{1}{r}$ $g(x) = rx + 1$ و $f(x) = \begin{cases} \frac{rx^2 - 1}{rx - 1} ; x \neq \frac{1}{r} \\ rx + k ; x = \frac{1}{r} \end{cases}$ (✓)

$a = \frac{1}{r}$ $rx + 1 = k + r \Rightarrow k + r = r$
 $k = 0$

$a + k = \frac{1}{r}$ ✓ (✓)

؟ $a-b$ - $\frac{1}{r}$ $g(x) = rx + b$ و $f(x) = \begin{cases} \frac{rx^2 - r}{rx + r} ; x \neq -\frac{r}{r} \\ rx + r ; x = -\frac{r}{r} \end{cases}$ (9)

$-ra + r = -r + b$
 $-ra = -r + b$

$ra = \frac{-r}{-r} + r = -ra + r$ (✓)

$a = \frac{-r}{-r} + \frac{b}{-r} = r - \frac{b}{r} = a \Rightarrow$

$-r - r = -ra + r \Rightarrow -2r = -ra + r \Rightarrow -3r = -ra \Rightarrow a = 3$

$$g(x) = x + r \quad , \quad f(x) = \begin{cases} \frac{x^r - r}{x - r} & ; x \neq r \\ ra^r + rx & ; x = r \end{cases} \quad (b)$$

$$f(x) = \frac{(x+r)(x-r)}{(x-r)} = x+r \quad \dots \text{Satz 1.10}$$

$$f(x) = x+r = g(x) = x+r \rightarrow x \in \mathbb{R} \quad (r)$$

$$f(x) = ra^r + ra = r$$

$$ra(a+1) = r \Rightarrow a(a+1) = 1$$

$$a = -1 \quad \text{und} \quad a = 1$$

