

$$x = a \Rightarrow f(x) \rightarrow a^r + \lambda a$$

$$\rightarrow a^r - \lambda \rightarrow a^r + \lambda a = a^r - \lambda \Rightarrow \lambda a = -\lambda \Rightarrow a = -1$$

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$$f(x) = \lambda \Rightarrow \frac{x^r + a}{x^r - b} = \lambda \Rightarrow \frac{x^r + a}{x^r - b} = \lambda \Rightarrow \frac{x^r + a}{x^r - (-1)} = \lambda \Rightarrow x^r + a = \lambda(x^r - (-1)) \Rightarrow x^r + a = \lambda x^r + \lambda \Rightarrow a = \lambda - 1$$

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$$g(x) = \lambda \Rightarrow x^r + b = \lambda \Rightarrow b = -1 \Rightarrow f(x) = \frac{x^r + 1}{x^r + 1} \Rightarrow f(1) = \frac{1^r + 1}{1^r + 1} = \frac{2}{2} = 1$$

$$f(x) = \frac{x^r + 1}{x^r + ax + b}, \text{ دامنه } = \mathbb{R} - \{-1, 1\} \Rightarrow x^r + ax + b = (x+1)(x-1) = x^r - 1$$

$$= x^r - 1 \Rightarrow a = 0, b = -1$$

$$\Rightarrow f(x) = \frac{x^r + 1}{x^r - 1} \Rightarrow f(1) = \frac{1^r + 1}{1^r - 1} = \frac{2}{0} = \text{undefined}$$

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$$f(x) = \frac{x^r - \sqrt{\lambda}}{-x^r + ax + b}, \text{ دامنه } = \mathbb{R} - \{-1\} \Rightarrow -x^r + ax + b = -(x+1)^r = -(x^r + 2x^{r-1} + \dots + 1)$$

$$= -x^r - 2x^{r-1} - \dots - 1 \Rightarrow a = 0, b = -1$$

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$$f(x) = \frac{x^r}{(x-1)(x^r + mx + 1)}, \text{ دامنه } = \mathbb{R} - \{1\}$$

$$x^r + mx + 1 = (x-1)^r \Rightarrow m = -r \Rightarrow x^r + mx + 1 = (x-1)^r \Rightarrow \Delta \leq 0 \Rightarrow m^2 - 4 \leq 0 \Rightarrow m^2 \leq 4 \Rightarrow -2 \leq m \leq 2$$

$$(I) \cup (II) = m = [-2, 2]$$

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$$f(x) = \sqrt{x - \frac{1}{x}}, x \in (I), x - \frac{1}{x} > 0 \Rightarrow x > \frac{1}{x} \Rightarrow x^2 > 1 \Rightarrow x > 1 \text{ or } x < -1$$

$$\text{ دامنه } = (I) \cup (III) \cup (II) = (-\infty, -1] \cup [1, +\infty)$$

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$$f(x) = \sqrt{mx^r + 2mx + 1}, \text{ دامنه } = \mathbb{R}, m \geq 0 (I) \quad \Delta \leq 0 \Rightarrow 4m^2 - 4m \leq 0$$

$$\Rightarrow 4m(m-1) \leq 0 \Rightarrow \frac{0}{+} \frac{1}{-} \frac{+}{+} (II) \Rightarrow m = (I) \cap (II) = [0, 1]$$

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V

$$f(x) = \begin{cases} \frac{px^2-1}{px-1} & x \neq \frac{1}{p} \\ px+k & x = \frac{1}{p} \end{cases} \quad \text{and } \mathbb{R} \setminus \left\{ \frac{1}{p} \right\} \quad a = \frac{1}{p}$$

$$g(x) = px+1 \rightarrow x = \frac{1}{p} \Rightarrow p \cdot \frac{1}{p} + k = p \cdot \frac{1}{p} + 1 \Rightarrow k = \cancel{1} 0$$

$$k+a = \cancel{1} + \frac{1}{p} = \frac{1}{p}$$

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$$f(x) = \begin{cases} \frac{9x^2-1}{3x+1} & x \neq -\frac{1}{3} \\ 3ax+1 & x = -\frac{1}{3} \end{cases}$$

$$x=1 \Rightarrow \frac{9-1}{3+1} = 3+b \Rightarrow 1=3+b \Rightarrow b=-2$$

$$x = -\frac{1}{3} \Rightarrow -3a+1 = -1-1 \Rightarrow a=1$$

$$\Rightarrow a-b = 1-(-2) = 3$$

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$$f(x) = \begin{cases} \frac{x^2-1}{x-1} & x \neq 1 \\ 2a^2+ax & x=1 \end{cases}$$

$$g(x) = x^2 \rightarrow x=1 \Rightarrow 1+1 = 2a^2+1a \Rightarrow a^2+a=1 \Rightarrow a^2+a-1=0 \Rightarrow a = \frac{-1 \pm \sqrt{1+4}}{2}$$

$$\underline{-2, 1}$$

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