

$$f(x) = \begin{cases} 2x-1 & ; [x] > 5 \rightarrow x > 5 \\ 5x+3 & ; [x] \leq 5 \rightarrow x \leq 5 \end{cases} \quad (۲)$$

$$y = \sqrt{f(x) - x + 1} \xrightarrow{x > 5} y = \sqrt{2x-1-x+1} = \sqrt{x} \rightarrow \textcircled{1} \cap \textcircled{2} = [5, +\infty)$$

$$\xrightarrow{x \leq 5} y = \sqrt{5x+3-x+1} = \sqrt{4x+2} \rightarrow \textcircled{1} \cap \textcircled{2} = \left[-\frac{1}{2}, 5\right]$$

$$D = \left[-\frac{1}{2}, 5\right) \cup [5, +\infty) = \left[-\frac{1}{2}, +\infty\right) \checkmark$$

$$y = \frac{25x^3 + 34x^2 + 11x + 3}{(5x^2 + 5x + 1)^2} = \frac{3(11x^3 + 12x^2 + 6x + 1)}{(5x^2 + 5x + 1)(5x^2 + 5x + 1)} = \frac{3(2x+1)(5x^2 + 5x + 1)}{(5x^2 + 5x + 1)(5x^2 + 5x + 1)} = \frac{3}{2x+1}$$

$$D = \mathbb{R} - \left\{-\frac{1}{2}\right\} \checkmark$$

در کل مخرج همیشه نقطه $-\frac{1}{2}$ است و همیشه دیگری نداریم.

$$y = \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} = \frac{(x^2 - 1)(x + 2)}{(x^2 - 1)} = x + 2 \rightarrow \boxed{C = 2} \checkmark$$

$$\begin{aligned} x = 1 &\rightarrow 3 = \frac{a+r}{1+b} \rightarrow 3+rb = a+r \\ x = -1 &\rightarrow 1 = \frac{-a+r}{b-1} \rightarrow b-1 = -a+r \end{aligned} \rightarrow \begin{cases} 3b - a = -1 \\ b + a = 2 \\ 4b = 1 \end{cases} \rightarrow \boxed{b = \frac{1}{4}} \checkmark$$

$$b + c = \frac{1}{4} + 2 = \frac{9}{4} \checkmark$$

$$f(x) = g(x) \rightarrow \frac{x^2 - 1}{x^2 + ax + b} = \frac{x+1}{x-c} \Rightarrow g(x) = \frac{(x+1)(x-1)}{(x-c)(x-1)} = f(x)$$

دفعه هاشو هم باید برابر باشه صغره اخذ بابت نوشتن

$$\rightarrow x^2 + ax + b = (x-c)(x-1) \rightarrow x^2 + ax + b = x^2 + (-1-c)x + c$$

$$\rightarrow a = -1-c, b = c \rightarrow a + b + c = -1 - c + c + c = c - 1$$

MR

$$\begin{aligned}
 g(x) &= f(x+1) + f(1-x) = (x-1)^r(x) + (-x-1)^r(-x) \\
 &= x(x-1)^r - x(x+1)^r = x[(x-1)^r - (x+1)^r] = x(-1 \cdot 2x) = -1 \cdot 2x^2 \\
 \Rightarrow g(x) &= -1 \cdot 2x^2 \checkmark
 \end{aligned}$$

$$\begin{aligned}
 1 - 2x &= -1 \rightarrow 2x = 2 \rightarrow x = 1 \quad x > 0 \rightarrow \epsilon \sqrt{1} = \epsilon \\
 1 - 2x &= 3 \rightarrow -2x = 2 \rightarrow x = -1 \quad x < 0 \rightarrow \sqrt{1} + 2 = 1 \\
 f(-1) + f(3) &= \epsilon + 1 = \epsilon \checkmark
 \end{aligned}$$

$$\begin{aligned}
 x + \sqrt{x} &= 4 \rightarrow \sqrt{x} = 4 - x \rightarrow x = 16 - 12x + x^2 \rightarrow x^2 - 13x + 16 = 0 \\
 x &= 9 \rightarrow 9 + 3 \neq 4 \quad \text{GGE} \\
 x &= \epsilon \rightarrow \epsilon + 2 = 4 \checkmark \\
 \Rightarrow f(4) &= f(\epsilon) + 3(\epsilon) = 2\epsilon + 12 = 12 \checkmark
 \end{aligned}$$

$$\begin{aligned}
 f(x-1) + f(1-x) &= (x-1)^3 + (x-1) + (1-x)^3 + (1-x) \\
 &= (x-1)^3 + (x-1) - (x-1)^3 - (x-1) = 0 \checkmark
 \end{aligned}$$

۹. اشتراک دامنه f و g فقط ۱ بوده است پس! ریشه رادیکال حالت.

$$\begin{aligned}
 x &= 1 \rightarrow \epsilon - 2a = 0 \rightarrow a = \frac{\epsilon}{2} \\
 b - \epsilon &= 0 \rightarrow b = \epsilon \\
 \Rightarrow 2f - g &= 2(K-1) - (2K) = K \rightarrow -2 = 2K \rightarrow K = -1 \\
 2a - \frac{b}{2} - K &= 2\left(\frac{\epsilon}{2}\right) - \left(\frac{\epsilon}{2}\right) - (-1) = \epsilon - \frac{\epsilon}{2} + 1 = 1 \checkmark
 \end{aligned}$$

۱۰. $\sqrt{x}$ ریشه رادیکال است.

$$\begin{aligned}
 D_f \cap D_g &= D_f \cap D_g = [-1, \infty], \quad g(x) = \sqrt{2x+2} \rightarrow D_g = [-1, \infty) \Rightarrow D_f = (-\infty, \infty] \\
 f(x) &= \sqrt{m-x} + n \rightarrow m - x = 0 \rightarrow \boxed{m=0} \quad f(g(x)) = \sqrt{2x} \rightarrow (x+n) - \sqrt{2x} = \sqrt{2x} \\
 \Rightarrow \boxed{n=2\sqrt{2}-2} &\rightarrow m+n = 0 + 2\sqrt{2} - 2 = 2\sqrt{2} - 2 \checkmark
 \end{aligned}$$

$$D_f = \mathbb{R} - \{c\}$$

۴- چون دو تابع با هم برابرند دامنه‌های برابر داشته‌اند:

یعنی برای g در مخرج ریشه مضاعف داشته:

$$n^2 + an + b = (n - c)^2 = n^2 - 2cn + c^2 \rightarrow \begin{cases} a = -2c \\ b = c^2 \end{cases}$$

$$g(n) = f(n) \rightarrow$$

همچنین ضابطه‌ها یکسان دارند:

$$\frac{n^2 - 1}{n^2 + an + b} = \frac{n + 1}{n - c} \rightarrow \frac{(n - 1)(\cancel{n + 1})}{(n - c)^2} = \frac{\cancel{n + 1}}{\cancel{n - c}} \rightarrow \begin{cases} c = 1 \\ a = -2 \\ b = 1 \end{cases} \text{ جواب: } \boxed{5}$$