

$$f(1-u) = \begin{cases} \sqrt{u} + 2 & u \leq 0 \\ \sqrt{u} & u > 0 \end{cases}$$

$$f(-1) + f(3) = 9 \xrightarrow{1 \rightarrow 2} 4 + 1 = 5 \rightarrow \text{جواب}$$

$$f(-1) \Rightarrow 1 - 2u = -1 \Rightarrow -2u = -2 \Rightarrow u = 1 \Rightarrow \sqrt{1} = 1$$

$$f(3) \Rightarrow 1 - 2u = 3 \Rightarrow -2u = 2 \Rightarrow u = -1 \Rightarrow \sqrt{-1} + 2 = 1$$

$$f(u + \sqrt{u}) = u^2 + 3u, \quad f(4) = 9$$

$$f(4) = 4^2 + 3 \times 4 = 16 + 12 = 28 \rightarrow \text{جواب}$$

$$u + \sqrt{u} = 4 \Rightarrow \sqrt{u} = 4 - u \xrightarrow{\text{مربع کردن}} u = 16 + u^2 - 8u \Rightarrow u^2 - 9u + 16 = 0 \Rightarrow (u-5)(u-4) = 0$$

$$\text{یکایک} \rightarrow \text{جواب} \rightarrow \text{if } u=5 \Rightarrow 5 + \sqrt{5} \neq 4 \checkmark$$

$$\text{if } u=4 \Rightarrow 4 + \sqrt{4} = 6 \neq 4 \times \text{جواب}$$

$$f(u) = u^2 + u, \quad f(u-1) + f(1-u) = 0 \quad u^2 + u - 3u^2 - 1 + u - 1 + u^2 - 3u + 3u^2 + 1 - u = 0 \rightarrow \text{جواب}$$

$$f(u-1) \Rightarrow (u-1)^2 + u-1 = u^2 + 3u - 3u^2 - 1 + u - 1$$

$$f(1-u) \Rightarrow (1-u)^2 + 1-u = 1 - u^2 - 3u + 3u^2 + 1 - u$$

$$f(u) = \sqrt{u-a} + k-1 \Rightarrow u-a \geq 0 \Rightarrow -a \geq -u \Rightarrow u \geq a \Rightarrow \frac{a}{k} \leq u$$

$$g(u) = \sqrt{b-ku} + k \Rightarrow b-ku \geq 0 \Rightarrow -ku \geq -b \Rightarrow ku \leq b \Rightarrow u \leq \frac{b}{k}$$

$$\frac{b}{k} = 1 \leq u \leq \frac{b}{k} = 2 \quad \text{چون } f-g = \{1, k\} \text{ پس یعنی عددی از این مجموعه داریم و } f \text{ و } g \text{ در این مجموعه مشترک دارند. پس } \frac{a}{k} = 1 \leq u \leq \frac{a}{k} = 2 \rightarrow a \leq k \rightarrow \frac{a}{k} \leq 1$$

$$f(1) - g(1) = k - 1 - k = -1 \rightarrow -k - 1 = k \Rightarrow 2k = -1 \Rightarrow k = -1$$

$$a - \frac{b}{k} - k = 3 \times \frac{4}{-1} - \frac{4}{-1} - (-1) = 4 - 2 + 1 = 3 \rightarrow \text{جواب}$$

$$f(u) = \sqrt{m-u} + n, \quad g(u) = \sqrt{u+2}, \quad D_f \times g = [-1, 5] \Rightarrow D_f \cap D_g = [-1, 5]$$

$$u+2 \geq 0 \Rightarrow u \geq -2 \Rightarrow u \geq -1 \Rightarrow D_g = [-1, +\infty)$$

$$m-u \geq 0 \Rightarrow u \leq m \Rightarrow m = 5, \quad D_f = (-\infty, 5]$$

$$f(5) - g(5) = \sqrt{5-m} + n - \sqrt{5+2} = 5+n - 2\sqrt{7} - 2\sqrt{7} \Rightarrow n = 4\sqrt{7} - 2$$

$$\rightarrow m+n = 4\sqrt{7} - 2 + 5 = 3 + 4\sqrt{7} \rightarrow \text{جواب}$$