

٢. آفرین ت

تکمیل لیسانس - دوازدهم دختر A - تکمیل شماره ٣

$$D = [5, +\infty) \cap (0, +\infty) \leftarrow 2x-1 \geq x-1 \rightarrow x \geq 0 \quad (1)$$

$$y = \sqrt{F(x) - x + 1} \rightarrow F(x) - x + 1 \geq 0 \rightarrow F(x) \geq x - 1 \rightarrow \begin{cases} x \geq 5 \rightarrow IF(2x-1) \\ x < 5 \rightarrow IF(4x+3) \end{cases} \quad (2)$$

$$F(x) = \begin{cases} 2x-1 & [x] > 5 \\ 4x+3 & [x] \leq 5 \end{cases}$$

$$\begin{aligned} &\rightarrow 4x+3 \geq x-1 \rightarrow x \geq -\frac{4}{3} \\ &\hookrightarrow D = [-\frac{4}{3}, 5) \end{aligned}$$

$$D_F = [-\frac{4}{3}, +\infty)$$

$$\frac{2x^3 + 3x^2 + 11x + 3}{(x^2 + x + 1)^2} \rightarrow \frac{3(1x^3 + 2x^2 + 4x + 1)}{(x^2 + 1)^2} = \frac{3(2x+1)^2}{(x^2+1)^2} \quad (2)$$

$$\rightarrow \frac{3}{2x+1} \rightarrow 2x+1 \rightarrow x \neq -\frac{1}{2} \rightarrow D_F = \mathbb{R} - \{-\frac{1}{2}\} \quad (3)$$

$$F(x) = \begin{cases} \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} \rightarrow x \neq \pm 1 \\ \frac{ax + r}{x + b} \rightarrow x = \pm 1 \end{cases} \quad (3)$$

$$\begin{aligned} &\rightarrow x+c = x+r \rightarrow \boxed{c=r} \\ &\rightarrow x+c = \frac{x^2(x+r) - (x+r)}{x^2-1} \end{aligned}$$

$$\hookrightarrow x=1 \rightarrow \frac{a+r}{b+1} = 3 \rightarrow 3b = a-1 \rightarrow 3b-a = -1$$

$$\hookrightarrow x=-1 \rightarrow \frac{-a+r}{b-1} = 1 \rightarrow b = -a+3 \rightarrow b+a = 3$$

$$\begin{aligned} &\underline{g(x) = x+c} \rightarrow b+c = ? \\ &D_g = \mathbb{R} \end{aligned}$$

$$\hookrightarrow 0/5+3=3/5$$

$$\cancel{1/2+2=2/2}$$

$$\begin{aligned} &3b = 2 \\ &\boxed{b = 2/3} \\ &\boxed{a = 1/3} \end{aligned}$$

$$F(x) = \frac{x+1}{x-c}$$

(r) (k)

$$\rightarrow \frac{x^r-1}{x^r+ax+b} = \frac{x^r-1}{(x-c)(x-1)}$$

$$g(x) = \frac{x^r-1}{x^r+ax+b}$$

$$\rightarrow x^r+ax+b = (x-c)^r = x^r - rcx + c^r$$

$$a+b+c=r$$

$$\rightarrow x^r - (c+1)x + c \rightarrow a = -rc$$

$$\rightarrow b = c$$

$$\rightarrow -rc + c + c = 0$$

$$F(x) = (x-r)^r(x-1)$$

(r) (d)

$$g(x) = F(x+1) + F(1-x) \rightarrow (x-r)^r(x) + (-x-r)^r(-x)$$

$$\rightarrow x[(x-r)^r - (x+r)^r] \rightarrow x(-1)x = -1x^2$$

$$F(1-rx) = \begin{cases} \sqrt[r]{x} + r & x \leq 0 \\ \sqrt[r]{x} & x > 0 \end{cases}$$

(r) (9)

$$\begin{matrix} 1-rx = -1 & 1-rx = r \\ F(-1) & + & F(r) \\ x=1 & & x=-1 \end{matrix} = \sqrt[r]{1} + \sqrt[r]{-1} + r \rightarrow \sqrt[r]{1} + 1 = 2$$

$$F(x+\sqrt{x}) = x^r + rx$$

(r) (v)

$$F(4) = ? \rightarrow x + \sqrt{x} = 4 \rightarrow \boxed{x=4} \rightarrow 4^r + 1r = 19$$

تذکره ادبیان

$$F(x) = x^3 + x \rightarrow x(x^2 + 1)$$

$$F(x-1) + F(1-x) \rightarrow (x-1)[(x-1)^2 + 1] + \underbrace{(1-x)}_{-(x-1)}[(1-x)^2 + 1]$$

$$\rightarrow (x-1)[(x-1)^2 + 1 - (x-1)^2 - 1] = 0$$

(2) (1)

$$F(x) = \sqrt{F x - 4a} + k - 1 \rightarrow F(1) = k - 1$$

$$g(x) = \sqrt{b - F x} + 3k \rightarrow g(1) = 3k$$

$$\rightarrow 2F(1) - g(1) = k \rightarrow 2k - 2 - 3k = k$$

$$-2 = 2k \rightarrow k = -1$$

$$2F - g = \{(1, k)\} \rightarrow D_F \cap D_g = \{1\}$$

$$4a - \frac{b}{F} - k = ? \quad \left[\frac{4a}{F}, +\infty\right) \rightarrow (-\infty, \frac{b}{F}] \rightarrow \frac{4a}{F} = \frac{b}{F} = 1 \rightarrow \begin{cases} a = F/4 \\ b = F \end{cases}$$

$$\rightarrow F - 2 + 1 = 3$$

$$F(x) = \sqrt{m - x} + k \rightarrow D_F = (-\infty, m]$$

$$g(x) = \sqrt{2x + 2} \rightarrow D_g = [-1, +\infty)$$

$$D_{F \cap g} = [-1, v]$$

$$\Rightarrow D_F \cap D_g = [-1, v] \rightarrow \underline{m = v}$$

$$F - g(x) = 4\sqrt{F} \rightarrow F(x) - g(x) = 4\sqrt{F} \rightarrow 2 + m - 2\sqrt{F} = 4\sqrt{F} \rightarrow m = 1\sqrt{F} + 2$$

$$m + n = ? \rightarrow \underline{1\sqrt{F} + 2}$$

(2) (10)