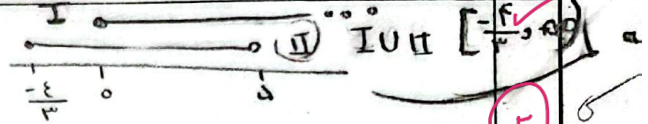


$$J = \sqrt{f(x) - x + 1}$$

I U II



$$f(x) = \begin{cases} 2x-1; [x] > 4 \Rightarrow \Delta, x = y = \sqrt{2x-1-x+1} = \sqrt{x} & x > 5 \\ 4x+3; [x] \leq 4 \Rightarrow x < 5 = y = \sqrt{4x+3-x+1} = \sqrt{3x+4} & x \leq 5 \end{cases}$$

$$y = \frac{24x^3 + 27x^2 + 18x + 3}{(4x^2 + 4x + 1)^2} = \frac{2(12x^3 + 13x^2 + 9x + 1)}{(4x^2 + 4x + 1)^2} = \frac{2(2x+1)^3}{(2x+1)^4} = \frac{2}{2x+1}$$

$$y = \frac{2}{2x+1} \Rightarrow x = R - \left\{ -\frac{1}{2} \right\}$$

$$f(x) = \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} = \frac{x(x^2 - 1) + 2(x^2 - 1)}{x^2 - 1} = \frac{(x+2)(x^2 - 1)}{x^2 - 1} = x+2, x \neq \pm 1$$

$$\frac{ax+2}{x+b} \xrightarrow{x=1} \frac{a+2}{1+b} = 3 \Rightarrow a+2 = 3+3b \Rightarrow -a+3b = -1$$

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

$$\Rightarrow \begin{cases} -a+3b = -1 \\ a+b = 3 \end{cases} \Rightarrow \begin{cases} b = \frac{1}{2} \\ a = \frac{5}{2} \end{cases}$$

$$f(x) = \frac{x+1}{x-1} \rightarrow D_f = R - \{1\} \Rightarrow \text{checkmark}$$

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

$$x^2 - 2x + 1 \Rightarrow a = -2, b = 1 \Rightarrow D_g = R - \{1\}$$

$$f(x) = (x-2)^2(x-1)$$

$$f(x+1) = (x-2)^2(x) = x^3 - 4x^2 + 4x$$

$$f(1-x) = (-x-2)^2(-x) = -x^3 - 4x^2 - 4x$$

$$g(x) = \frac{-12x^2}{(x-1)^2}$$

$$-1 - \frac{1}{(x+1)^2} = \frac{1}{(x+1)^2} = \frac{1}{x^2+2x+1} = \frac{1}{x^2+1} + \frac{2x}{x^2+1}$$

$$f(1-rx) \begin{cases} \sqrt{x+r} & x \geq 0 \\ \varepsilon \sqrt{x} & x < 0 \end{cases}$$

$$f+1 = \varepsilon \sqrt{x}$$

$$f(r) = f(1-r(-1)) \Rightarrow \sqrt{-1+r} = 1 \quad f(-1) = f(1-r(1)) = \varepsilon \sqrt{-1} = \varepsilon$$

$$f(x+\sqrt{x}) = x^r + r\sqrt{x} \quad x+\sqrt{x} = y \quad x = \frac{y^2}{4} \quad \rightarrow f(y+\sqrt{y}) = (y)^r + r\sqrt{y} = \frac{y^r}{4} + \frac{r\sqrt{y}}{2}$$

$$f(x) = x^r + x \quad \left\{ \begin{array}{l} f(\frac{1}{x-1}) = T^r + T \\ f(\frac{-1}{1-x}) = -T^r - T \end{array} \right\} \oplus T^r + T - T^r - T = 0$$

$$f-g = \{(1, k)\} \Rightarrow \sqrt{x} - f + k - r - \sqrt{x} - f + rk = 1r \quad -rk + k - 1 = k \Rightarrow k = \frac{1}{r}$$

$$D_{f \cap g} = \{1\}$$

$$D_f \rightarrow \varepsilon x - ra \geq 0 \Rightarrow x \geq \frac{r}{\varepsilon} a \Rightarrow \frac{r}{\varepsilon} a = 1 \Rightarrow a = \frac{\varepsilon}{r} \quad \frac{b}{f} = 1 \Rightarrow b = r$$

$$f(x) = \sqrt{m-x} + n \Rightarrow D_f = m-x \geq 0 \Rightarrow x \leq m \quad g(x) = \sqrt{rx+r} \rightarrow D_g = rx+r \geq 0 \Rightarrow x \geq -1$$

$$f-g(r) = \sqrt{y-r} + n - r\sqrt{r} = y\sqrt{r} \Rightarrow n = 1\sqrt{r-r} \Rightarrow m+n = 1\sqrt{r} + \varepsilon$$

$$b^r + b^{-r} \\ (b+r)(b-r)$$

9. اشتراك دافعه f و g فقط $a=1$ است يعني:

$$D_f = \left[\frac{a}{f}, +\infty \right) \quad D_g = \left(-\infty, \frac{b}{f} \right] \xrightarrow{\quad} \{1\}$$

$$\frac{a}{f} = \frac{b}{f} = 1 \rightarrow a = \frac{f}{f} \quad b = f$$

$$f(1) - g(1) = K \rightarrow 2K - 2 - 2K = K \rightarrow K = -1$$

$$a - \frac{b}{f} = K = \boxed{1}$$