

$$g = \{(-1, 1), (0, 4), (2, 0), (1, 2)\} \quad 2g - 3f = \{(-1, 2), (0, 6), (1, 4)\} \quad (1)$$

$$f(n) = \sqrt{1-n^2} \Rightarrow 1-n^2 \geq 0 \Rightarrow 1 \geq n^2 \Rightarrow 1 \geq n$$

$$2g = \{(1, 2), (0, 4), (2, 0), (1, 2)\}, 3f = \{(-1, 0), (0, 1), (1, 0)\} \Rightarrow 2g - 3f = \{(1, 2), (0, 3), (1, 2)\}$$

$$R(2g - 3f) = \{2, 6, 4\} \Rightarrow 2 + 6 + 4 = 12$$

$$f(n) = 2n - 1, D_f = [3, +\infty) \xrightarrow{n=3} f(3) = 5 \Rightarrow R_f = [5, +\infty) \quad (2)$$

$$g(n) = \frac{1}{n} + 3 \xrightarrow{n=3} g(3) = 4 \Rightarrow R_g = (-\infty, 4] \quad (3)$$

$$y = \frac{-n^2}{4} + n + 3, \frac{-b}{2a} = \frac{-1}{-1/2} = 1 \Rightarrow \text{if } n=1 \Rightarrow y = \frac{1}{4} + 1 + 3 = 3\frac{1}{4} = \frac{13}{4}$$

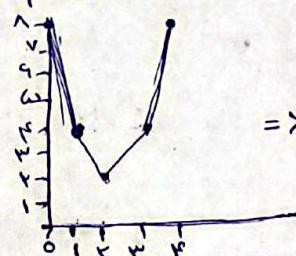
$$a < 0 \Rightarrow a \max \Rightarrow R_y = (-\infty, \frac{13}{4}] \Rightarrow \text{if } R_y \supset \frac{3}{4} \Rightarrow (a, b) = (\frac{3}{4}, \frac{13}{4}) \Rightarrow$$

$$a = \frac{3}{4}, b = \frac{13}{4} \Rightarrow \sqrt{b-a} = \sqrt{\frac{13}{4} - \frac{3}{4}} = \sqrt{\frac{10}{4}} = \sqrt{\frac{5}{2}}$$

$$y = \underbrace{|n-1|}_1 + \underbrace{|n-3|}_3 + \underbrace{|2n-4|}_2, \quad \frac{1}{-f(n+1)} \quad \frac{1}{|-2n+6|} \quad \frac{1}{|2n-4|} \quad \frac{1}{|f(n-1)|} \quad (4)$$

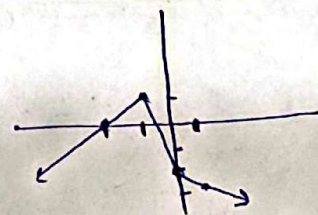
$$f(0) = 1, f(1) = 4, f(2) = 2, f(3) = 4, f(4) = 1$$

$$R_f = [2, +\infty) \Rightarrow \min = 2$$



$$y = \underbrace{|n|}_0 - 2 \underbrace{|n+1|}_1 \quad \frac{0}{n+2} \quad \frac{1}{-3n-2} \quad \frac{0}{-n-2}$$

$$f(1) = -3, f(0) = -2, f(-1) = 1, f(-2) = 0$$



$$\Rightarrow R_f = (-\infty, 1]$$

$$y = \frac{n^2 + \omega n + m}{n+1} \Rightarrow y_{n+1} - y_n = \frac{n^2 + \omega n + m}{n+1} - \frac{n^2 + \omega n + m}{n} = \frac{n^2 + \omega n + m - (n^2 + \omega n + m + n)}{n(n+1)} = \frac{-n}{n(n+1)} = \frac{-1}{n+1}$$

$$\Delta < 0 \Rightarrow (\omega - y)^2 - 4(m - y) < 0 \Rightarrow 2\omega - 4y + y^2 - 4m + 4y < 0$$

$$y^2 - 4y + 2\omega - 4m < 0 \Rightarrow (-2) \pm \sqrt{4 - 4(2\omega - 4m)} < 0 \Rightarrow m < 1 \Rightarrow b, c, r$$

$$\frac{-2 \pm \sqrt{4 - 4(2\omega - 4m)}}{2} = \frac{-2 \pm \sqrt{4 - 8\omega + 16m}}{2} = \frac{-2 \pm 2\sqrt{1 - 2\omega + 4m}}{2} = -1 \pm \sqrt{1 - 2\omega + 4m}$$

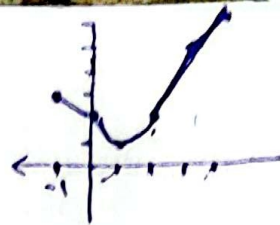
$$-1 - \sqrt{1 - 2\omega + 4m} < -1$$

$$\rightarrow -ka < 1$$

$$\rightarrow \sqrt{b-a} = 1$$

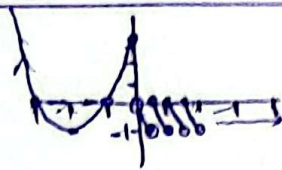
$$f(x) = \begin{cases} x+2 & ; x \geq 2 \\ x^2 - 2x + 2 & ; 0 \leq x < 2 \\ |x| + 2 & ; x < 0 \end{cases}$$

$$\begin{aligned} f(2) &= 4 & f(0) &= 2 \\ f(2) &= 6 & f(-1) &= 3 \\ f(2) &= 2 & f(-1) &= 3 \\ f(1) &= 1 \end{aligned}$$



$$R_f = [1, +\infty)$$

$$f(x) = \begin{cases} x^2 + 2x + 2 & ; x \leq 0 \\ [x] - 2x & ; x \geq 0 \end{cases}$$



$$\begin{aligned} f(-3) &= 0 & f(1/2) &= 0 \\ f(-2) &= -1 & & \\ f(1) &= 0 & & \\ f(0) &= 2 & & \end{aligned}$$

$$R_f = [-1, +\infty)$$

$$y = a + 1 - \sqrt{x+2} \Rightarrow \sqrt{x+2} = x+2 \Rightarrow x+2 \geq 0 \Rightarrow x \geq -2 \Rightarrow D_f = [b, +\infty) \Rightarrow b = -2$$

$$\frac{-4}{x} = x \Rightarrow y = 6 \Rightarrow a + 1 - 0 = 6 \Rightarrow a = 5 \Rightarrow a \times b = 5 \times -2 = -10$$

$$f(x) + g(x) = x\sqrt{x+1} - x^2, \quad f(x) = x\sqrt{x+1} + x\sqrt{1-x}, \quad D_f = D_g$$

$$\sqrt{x+1} \geq 0 \Rightarrow x+1 \geq 0 \Rightarrow x \geq -1, \quad \sqrt{1-x} \geq 0 \Rightarrow 1-x \geq 0 \Rightarrow x \leq 1 \Rightarrow D_f = [-1, 1]$$

$$f(x) + g(x) - f(x) = g(x) \Rightarrow x\sqrt{x+1} - x^2 - (x\sqrt{x+1} + x\sqrt{1-x}) = g(x) \Rightarrow \sqrt{1+x} - \sqrt{1-x}$$

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

$$\frac{x(\sqrt{1-x} + x\sqrt{1+x})}{x} = \frac{x\sqrt{1+x} + \sqrt{1-x}}{x} \Rightarrow D_f = [-1, 1] \Rightarrow R_f =$$

$$\left. \begin{aligned} \text{if } x = -1 &\Rightarrow \frac{x\sqrt{1-x} + \sqrt{1+x}}{x} = \frac{\sqrt{2}}{x} \\ \text{if } x = 1 &\Rightarrow \frac{x\sqrt{1-x} + \sqrt{1+x}}{x} = \frac{x\sqrt{2}}{x} \end{aligned} \right\} \Rightarrow R_f = \left[ \frac{\sqrt{2}}{x}, \frac{x\sqrt{2}}{x} \right]$$

$$f(x) + g(x) = x\sqrt{x+1} - x^2 \xrightarrow{\text{POF}} x(\sqrt{1-x} + \sqrt{1+x}) \xrightarrow{\text{RHS}} x(\sqrt{1-x} + \sqrt{1+x})$$

$$\rightarrow g(x) = \sqrt{1+x} - \sqrt{1-x}$$

$$\frac{f(x)}{g} = \frac{g(x)}{x} = \sqrt{1-x}$$

