

$$1) \quad 2g = f(-1, 2) (0, 1) (2, 0) (1, 4)$$

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

$$2g - 3f = f(-1, 2) (0, 1) (1, 4) \rightarrow R = \{2, 0, 4\} \rightarrow 2 + 4 + 0 = 11$$

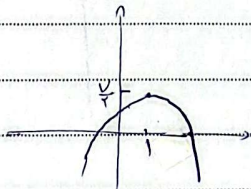
$$2) \quad x \geq 3 \rightarrow 2x \geq 4 \rightarrow x - 1 \geq 1 \rightarrow R_f = [1, +\infty)$$

$$\rightarrow [1, +\infty) \cup (-\infty, 4]$$

$$x \leq 3 \rightarrow \frac{1}{x} x \leq 1 \rightarrow \frac{1}{x} x + 3 \leq 4 \rightarrow R_g = (-\infty, 4] = R - (4, 1)$$

$$3) \quad \frac{y}{x} = \frac{-x^2 + x + 3}{x} \rightarrow y = -x^2 + x + 3 \rightarrow x^2 - x - 3 = 0 \rightarrow (x - 2)(x + 1)$$

$$x \rightarrow (a, b) = (-1, 3) \rightarrow \sqrt{b - a} = \sqrt{3 - (-1)} = \sqrt{4} = 2$$



$$\text{ext} \quad \left| \begin{array}{l} -\frac{b}{2a} = \frac{-1}{2(-1)} = \frac{1}{2} \\ -\frac{1}{4} + 1 + 3 = \frac{11}{4} \end{array} \right.$$

$$4) \quad x = 1 \rightarrow y = |1 - 1| + |1 - 3| + |2 - 4| = 0 + 2 + 2 = 4$$

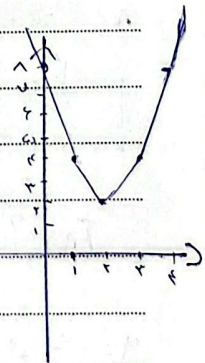
$$x = 3 \rightarrow y = |3 - 1| + |3 - 2| + |4 - 4| = 2 + 1 = 3$$

$$x = 2 \rightarrow y = |2 - 1| + |2 - 3| + |4 - 4| = 1$$

$$x = 4 \rightarrow y = |4 - 1| + |4 - 2| + |1 - 4| = 3 + 2 + 1 = 6$$

$$x = 0 \rightarrow y = |0 - 1| + |0 - 3| + |0 - 4| = 1 + 3 + 4 = 8$$

$$\boxed{\text{معدل} = 2}$$



5) a)

$$\begin{array}{l} -1 \quad 0 \\ -x - x + x = x + 2 \quad -x - x - x = -3x \quad x - x - x = -x - x \end{array}$$

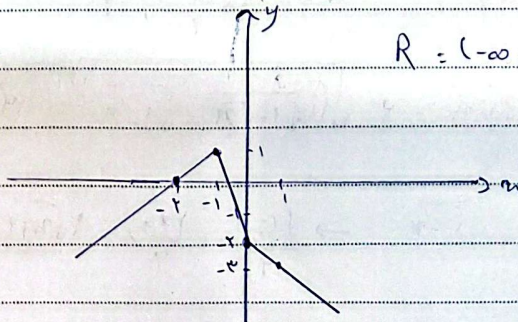
$$x = 0 \rightarrow y = -2$$

$$x = -1 \rightarrow y = 1$$

$$x = 1 \rightarrow y = -3$$

$$x = -2 \rightarrow y = 0$$

$$R = (-\infty, 1]$$



9) $y(n+y) = x^2 + a(n+m) \rightarrow x^2 + (a-y)(n+m) = 0$

$m=5 \rightarrow \frac{x+2a+5}{x+1} = x+5, \frac{x+1}{x+1} \text{ IR}$

$b^2 \geq 4ac \rightarrow (a-y)^2 \geq (n+y) \rightarrow (a+y)^2 - 1 \geq n = 4$

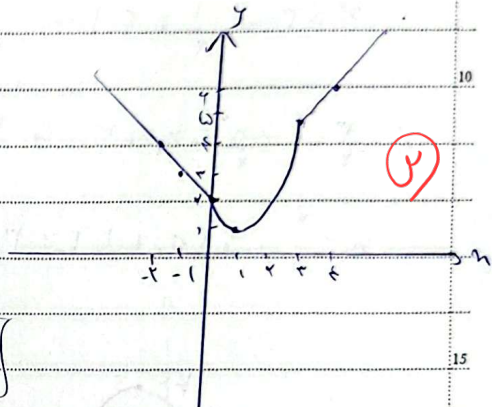
$\rightarrow y^2 - 4y + 1a - 4m \geq 0 \quad \begin{cases} a \geq 0 \\ \Delta \leq 0 \rightarrow b^2 - 4ac \leq 0 \rightarrow b^2 \leq 4ac \rightarrow 34 \leq 4(1a - 4m) \\ \rightarrow 9 \leq 1a - 4m \rightarrow 4m \leq 1a - 9 \rightarrow m \leq 4 \end{cases}$

$m = \{1, 2, 3, 4\}$

11) $x+2 \rightarrow x=2 \rightarrow y=2$

$x=4 \rightarrow y=4$

$x^2 - 2x + 2 \rightarrow \begin{cases} -b \\ ra \end{cases} = \frac{2}{2} = 1 \rightarrow x=0 \rightarrow y=2$
ent $\begin{cases} 1 - 2 + 2 = 1 \\ 1 - 4 + 2 = -1 \end{cases} \quad x=2 \rightarrow y=2$



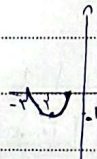
$x \leq 0 \rightarrow x=0 \rightarrow y=2$

$x=-1 \rightarrow y=2$

$R = [1, +\infty)$

12) $(n+1)(n+2) = 0 \rightarrow n = -1$

ent $\begin{cases} -b \\ ra \end{cases} = \frac{-2}{1} = -2$
 $\begin{cases} 1 - 1 + 2 = 2 \\ 1 - 4 + 2 = -1 \end{cases}$



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

$R = \{0, 2\} = [-1, 0]$

$[2n] - 2n \rightarrow (-1, 0] \text{ ②}$

$[-1, +\infty)$

9) $2n+2 \geq 0 \rightarrow 2n \geq -2 \rightarrow n \geq -1 \rightarrow D = [-1, +\infty)$

$b^2 - 4ac = 0$

$a = a+1 = 0 \rightarrow a = -1$

$ab = 2 \times -1 = -2$

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

$g(x) = \sqrt{x+1} - \sqrt{1-x} \Rightarrow \frac{f(x)}{4} = \frac{g(x)}{4} = \frac{\sqrt{x+1} + \sqrt{1-x}}{4} \rightarrow \frac{\sqrt{x+1} + 2\sqrt{1-x}}{4}$

$\frac{f(x)}{4} \leq \frac{g(x)}{4} \rightarrow -1 \leq x \leq 1 \rightarrow -1 \leq x \leq 1 \rightarrow 0 \leq \sqrt{1-x} \leq \sqrt{2}$
 $R = [-1, 1]$

$n+1 \geq 0 \rightarrow n \geq -1 \rightarrow [-1, 1]$