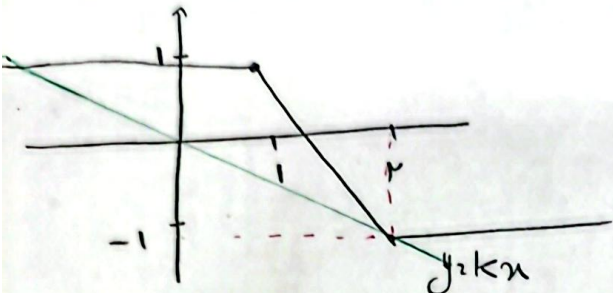
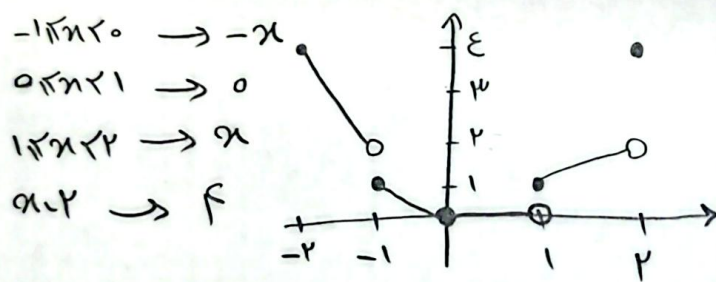


$\alpha_{20} \rightarrow f(x) = \sqrt{bx+c} \rightarrow f(x) = 0$
 $\begin{cases} 2b+c_{20} \rightarrow b=1, c=-2 \\ 3-b+c_{21} \end{cases} \rightarrow f(x) = 1$
 $\Rightarrow g(x) = \sqrt{x^2 + \epsilon} \rightarrow R_g = [\epsilon, +\infty)$



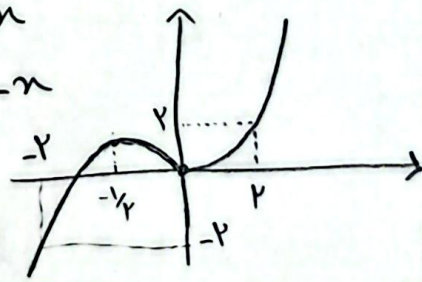
$\Rightarrow y = -\frac{1}{2}x \rightsquigarrow k = -\frac{1}{2}$

(الف) $-2x \leq -1 \rightarrow -2x \quad R_F = [0, 4]$



(ب) $x > 0 \rightarrow x^2 - x$
 $x < 0 \rightarrow -x^2 - x$

$\Rightarrow R_F = [-2, 2]$



$y = \frac{2x+2}{x^2+n} \rightarrow \frac{2(n+1)}{n(n+1)} \rightarrow y = \frac{2}{n} \rightarrow n \neq -1$
 $\Rightarrow R_g = R - \{-1\} \rightsquigarrow a+b, 2-2, [0]$

$\Rightarrow R_g = R - \{2, -2\} \rightsquigarrow a+b, 2-2, [0]$

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(الف) $y = \left(2\left(\frac{x}{2} - \left\lfloor \frac{x}{2} \right\rfloor\right)\right)^2 \rightsquigarrow R_F = [0, 4]$
 $[0, 1)$

(ب) $y = f(x) + \epsilon \rightsquigarrow -1 \leq f(x) \leq 1 \rightsquigarrow f(x) + \epsilon \leq 1 + \epsilon$
 $3 \leq f(x) \leq 5 \rightsquigarrow 1 \leq f(x) \leq 5 \rightarrow R_F = [1, 5]$

$x^2 \rightarrow 0 \rightsquigarrow y = \pm \frac{2}{\sqrt{2}}$
 $x^2 \rightarrow \infty \rightsquigarrow y = 1 \Rightarrow R_F = [-\frac{2}{\sqrt{2}}, \frac{2}{\sqrt{2}}] \cup (1, +\infty)$
 $\Rightarrow a+b+c = -\frac{2}{\sqrt{2}} + \frac{2}{\sqrt{2}} + 1 = 1$

(الف) $f(x) = e^x + x \rightsquigarrow \lim_{x \rightarrow -1} \left| \frac{-1}{-1} \right| \rightsquigarrow R_F = [-1, +\infty)$

$\rightsquigarrow 0 \leq \sqrt{x+1} \rightarrow 0 \leq x+1 \rightarrow 0 \leq \frac{x^2+1}{x}$
 $-\frac{1}{x} + \frac{1}{x} \rightsquigarrow R_F = (0, +\infty)$

(ب) $3 + 2x - x - 2x^2 \rightarrow -2x^2 + x + 3$
 $x = -1 \rightarrow -1 - 2 + 3 = 0$
 $x = 1 \rightarrow -1 + 2 + 3 = 4 \Rightarrow R_F = [0, 4]$
 $x = \frac{b}{2a} = \frac{-1}{-4} = \frac{1}{4} \rightsquigarrow -1 + 2 + 3 = 4$

$R_F = [1, 9]$

$\rightarrow x = 1 \rightarrow y = \frac{1^2}{1} \rightarrow x = 2 \rightarrow y = \frac{2^2}{2}$
 $\rightarrow x = 3 \rightarrow y = \frac{3^2}{3} \rightarrow x = 4 \rightarrow y = \frac{4^2}{4}$
 $\rightarrow x = 5 \rightarrow y = \frac{5^2}{5} \rightarrow x = 6 \rightarrow y = \frac{6^2}{6}$
 $\rightarrow x = 7 \rightarrow y = \frac{7^2}{7} \rightarrow x = 8 \rightarrow y = \frac{8^2}{8}$
 $\rightarrow x = 9 \rightarrow y = \frac{9^2}{9}$

$\Rightarrow \frac{1+2+3+4+5+6+7+8+9}{9}$
 $= \frac{45}{9} = 5$

$$P_{m,n} = \frac{(\sqrt{n}-1)(\sqrt{n}-\mu)}{(\sqrt{n}-1)(\sqrt{n}-1)} = \frac{\sqrt{n}-\mu}{\sqrt{n}-1}$$

-9

$$RP, RP - \left\{ \frac{c}{a} \right\} \rightarrow \boxed{RP - \{1\}}$$

$$P_n = \frac{(n+1)(n-1)(n+2)}{(n+1)(n-1)} = n+2$$

$\checkmark$
 $n \neq \pm 1$

-10

$$\Rightarrow RP, RP - \{1, \mu\} \rightarrow 1 + \mu \sqrt{\varepsilon}$$