

الف) $f(x) = 2 \sin^2(x + \frac{\pi}{3}) - 1$

max $\rightarrow 2 - 1 = 1$

min $\rightarrow 0 - 1 = -1$

$\rightarrow R_{f(x)} = [-1, 1]$

(۱)

ب) $g(x) = 3 \cos^3 x - 4$ $\rightarrow -1 \leq \cos x \leq 1$

$\Rightarrow -7 \leq 3 \cos^3 x - 4 \leq -1 \rightarrow R_{g(x)} = [-7, -1]$

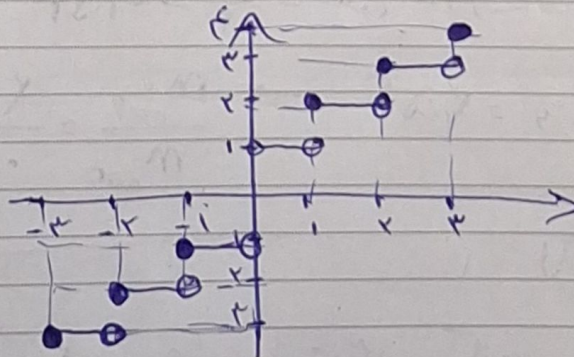
$y = \frac{x}{|x|} + [x] \Rightarrow \pm 1 + [x]$

(۲)

$\rightarrow [-3, 5] \rightarrow -1 - 3 = -4 / [-2, -1] \rightarrow -1 - 2 = -3$

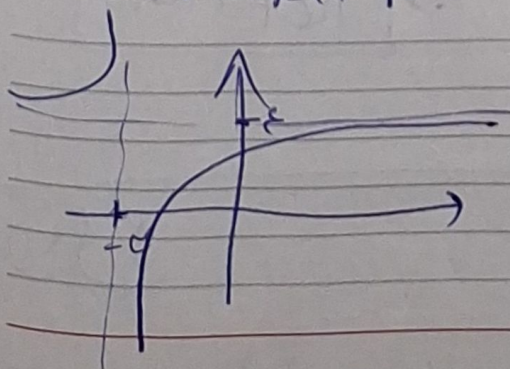
$\rightarrow [-1, 0] \rightarrow -1 - 1 = -2 / [0, 1] \rightarrow -1 + 0 = -1$

$\rightarrow [1, 2] \rightarrow 1 + 1 = 2 / [2, 3] \rightarrow 1 + 2 = 3 / [3, 5] \rightarrow 1 + 3 = 4$

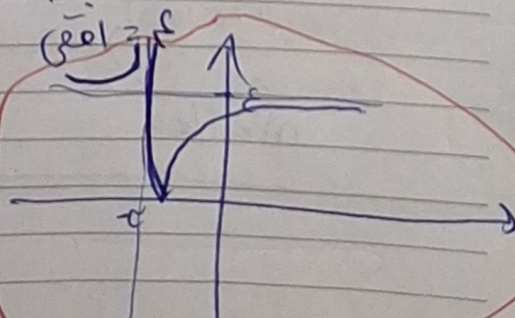


$y = \left| \frac{x+1}{x+3} \right| \rightarrow y = \frac{x+1}{x+3} \rightarrow \text{مقادیر} = -3$

(۳)



مقادیر
محدود



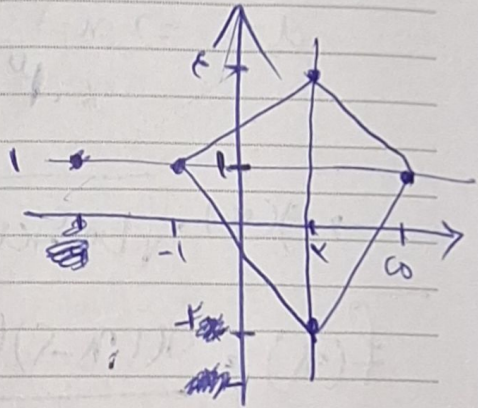
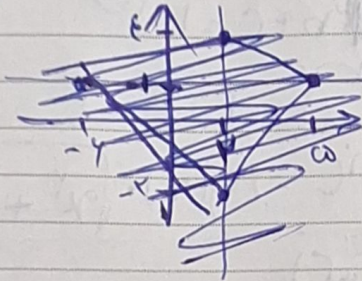
$$|x-2| + |y-1| = 3$$

(+2)

(+1)

(2)

$$2+1+3=6$$



$$f(x) = x + \frac{1}{x} + 2\sqrt{x+1}$$

(3)

$$(-\infty, -2] \cup [2, +\infty) \quad [2\sqrt{x+1}, +\infty)$$

$$\rightarrow R_f = (-\infty, -2] \cup [2, +\infty) \cup [2\sqrt{x+1}, +\infty) = (-\infty, -2] \cup [2, +\infty) - (2\sqrt{x+1})$$

$$y = -\sin^2 x + 2 \sin x + 3$$

$$\begin{aligned} \max &= 4 \\ \min &= -1 - 2 + 3 = 0 \\ -b/2a &= -1/2 \end{aligned}$$

$$\Rightarrow R_f = [0, 4]$$

$$f(x) = \frac{1}{x} + 10, D_f = [1, 9]$$

(4)

$$\frac{1}{x} + 10 = \frac{1}{9} + 10 \Rightarrow \frac{1}{x} = \frac{1}{9} \Rightarrow x = 9$$

$$+90 - 18 = 72$$

$$9 \times 10 = 90 \Rightarrow \frac{1}{2} (1 + 4 + \dots + 9) = \frac{1}{2} \left(\frac{9 \times 10}{2} \right) = \frac{90}{2} = 45$$

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 $f(x) = \sqrt{ax^2 + bx + c}$

$$\begin{aligned} a=0 &\Rightarrow x=2 \rightarrow 2b+c=0 \\ x=1 &\rightarrow b+c=1 \end{aligned} \Rightarrow \begin{aligned} b &= 1 \\ c &= -2 \end{aligned}$$

$$\rightarrow g(x) = \sqrt{bx^2 + ax - c} \Rightarrow g(x) = \sqrt{x^2 + 1} \rightarrow \text{Reg}(x) = [2, +\infty)$$

$$f(x) = \frac{x(x-5)(x+7)}{x+2} = x(x-2) \quad \frac{+2}{2} = 1 \rightarrow y_1 = -1$$

$$Df = \mathbb{R} - \{a, b\}$$

$$x^2 - 2m = A \rightarrow x^2 - 2m - A = 0$$

$$(x+2)(x+7) = 0$$

$$\begin{aligned} a &= -2 \\ b &= +2 \end{aligned}$$

$$\rightarrow Rf = [-2, +\infty) - \{1\} \Rightarrow \left[f\left(\frac{-2+2}{-2}\right), +\infty \right)$$

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 $g = \sqrt{x^2 + ax^2 + bx - 1}$ با توجه به

$$\rightarrow x^2 + ax^2 + bx - 1 = (x-2)^2 = x^2 - 4x + 12 - 1$$

$$g(x) = \sqrt{(x-2)^2} \Rightarrow a = -4, b = +12 \rightarrow Df = [-4, +12]$$

$$\rightarrow Rf = [-4-2, +12-2] \Rightarrow Rf = [-6, +10]$$

$$y = [x] + \left[x + \frac{1}{x}\right]$$

$$\left(x + \frac{1}{x} + 1\right) \rightarrow y = 1$$

$$\left(1 + \frac{1}{x} + \frac{1}{x}\right) \rightarrow y = 2$$

$$\left(\frac{1}{x} + \frac{1}{x} + 1\right) \rightarrow y = 2$$

