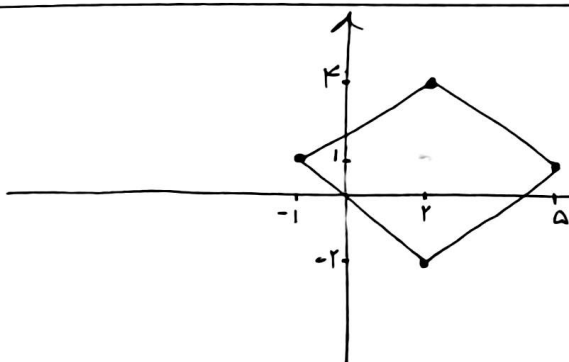
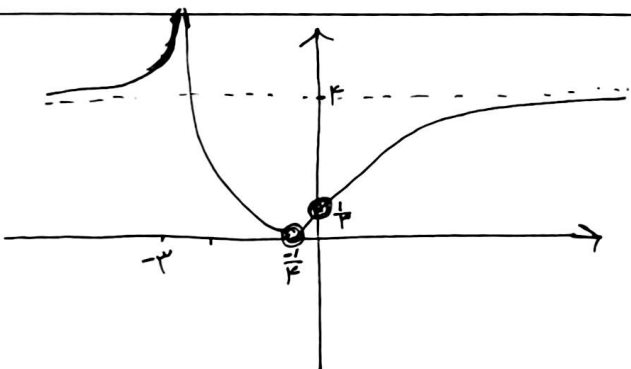
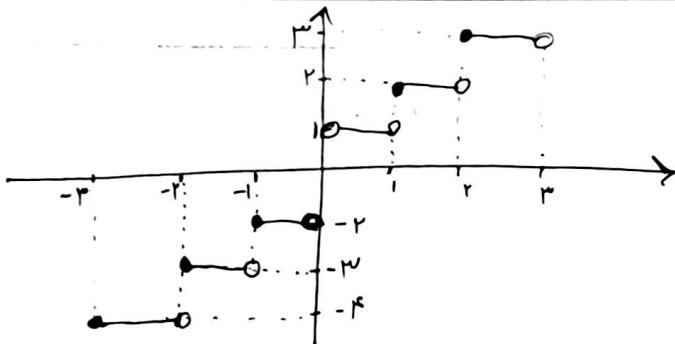


الف) $\sin(x + \frac{\pi}{3}) = 1 \rightarrow x - 1 = 1$ و $\sin(x + \frac{\pi}{3}) = 0 \rightarrow 0 - 1 = -1$
 $R = [-1, 1]$

ب) $\cos x = 1 \rightarrow x - 1 = -1$, $\cos x = -1 \rightarrow -x - 1 = -1$
 $R = [-1, 1]$



$x \geq 2, y \geq 1 \rightarrow y = 4 - x$
 $x \geq 2, y < 1 \rightarrow y = x - 1$
 $x < 2, y \geq 1 \rightarrow y = x + 1$
 $x < 2, y < 1 \rightarrow y = 4 - x$

الف) $x + \frac{1}{x} \geq 2 \Rightarrow$ تابع صعودی $\Rightarrow$ کمترین مقدار $2 + 2\sqrt{2} \Rightarrow R = [2 + 2\sqrt{2}, +\infty)$

ب) $3 + 2\sin x - \sin^2 x \Rightarrow 4 - (\sin x - 1)^2$

$-1 \leq \sin x \leq 1 \Rightarrow 0 \leq 4 - (\sin x - 1)^2 \leq 4 \Rightarrow R = [0, 4]$

$$= \frac{1}{10} (1+2+\dots+9) + 9(10) = \frac{-15}{10} + 90 = \underline{V\omega}$$

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$$[2, +\infty) \Rightarrow a=0 \Rightarrow x=2 \rightarrow \sqrt{3b+c} = \sqrt{1}$$

$$x=2 \Rightarrow \sqrt{3b+c} = 0 \Rightarrow b=1, c=-2$$

$$g(x) = \sqrt{x^2+4} \Rightarrow x=0 \rightarrow \sqrt{4}=2 \Rightarrow R_g = [2, +\infty)$$

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$$\frac{x(x-2)(x+2)}{x+2} \quad x \neq -2 \rightarrow f(x) = x^2 - 2x$$

$$x^2 - 2x = 1 \Rightarrow (x-1)(x+1) = 0 \Rightarrow x = 1 \text{ or } -1$$

$$f(x) = (x-1)^2 - 1 \Rightarrow c = -1, a+b = 4-2 = 2$$

$$f\left(\frac{1}{-1}\right) = f(-1) = (-1)^2 - 2(-1) = 3$$

8

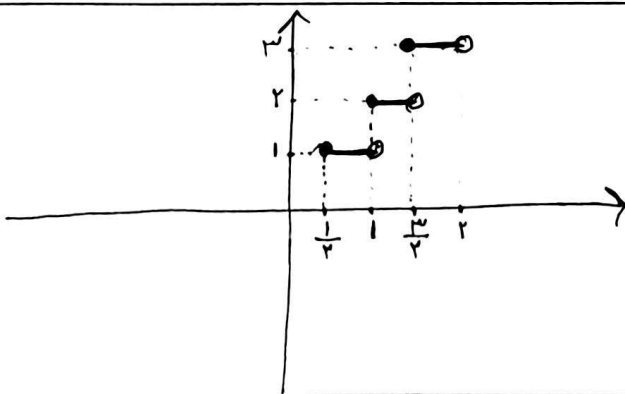
$$x^3 - 1 \rightarrow -1 = (-2)^3 \Rightarrow \sqrt[3]{(x-2)^3} \Rightarrow \sqrt[3]{x^3 - 6x^2 + 12x - 1}$$

$$\Rightarrow a = -4, b = 12 \rightarrow D = [-4, 12]$$

$$x = -4 \rightarrow -4 - 2 = -6$$

$$x = 12 \rightarrow 12 - 2 = 10 \quad \left. \vphantom{x = 12} \right\} R = [-6, 10]$$

9



bto infinity

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