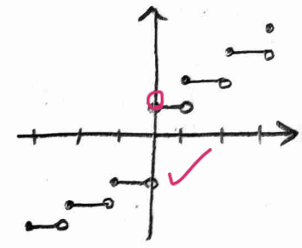
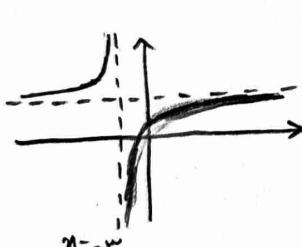
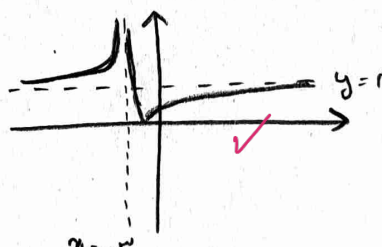
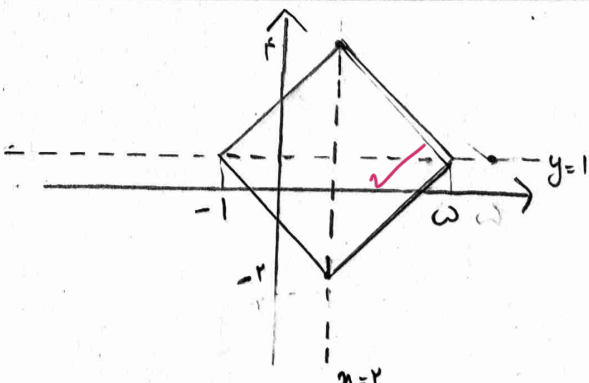


الف) $f(x) = 2\sin^2(x + \frac{\pi}{3}) - 1$ $\sin^2 x \in [0, 1] \rightarrow 2\sin^2 x \in [0, 2]$ $\rightarrow 2\sin^2 x + 1 \in [1, 3]$	ب) $g(x) = 3\cos^3 x - 4$ $\cos x \in [-1, 1] \rightarrow \cos^3 x \in [-1, 1]$ $3\cos^3 x \in [-3, 3] \rightarrow 3\cos^3 x - 4 \in [-7, -1]$	۲ ۱
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$x \in [-3, -2) \rightarrow y = -1 - 3 = -4$ $x \in [-2, -1) \rightarrow y = -1 - 2 = -3$ $x \in [-1, 0) \rightarrow y = -1 - 1 = -2$ $x \in [0, 1) \rightarrow y = 1 + 0 = 1$	$x \in [1, 2) \rightarrow y = 1 + 1 = 2$ $x \in [2, 3) \rightarrow y = 1 + 2 = 3$ $x \in [3] \rightarrow y = 1 + 3 = 4$	 صفر تعریف شده است	۲ ۲
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$y = \left \frac{x+1}{x+3} \right $ 		۲ ۳
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$x < 2, y > 1 \rightarrow y = x + 2$ $x > 2, y > 1 \rightarrow y = 4 - x$ $x < 2, y < 1 \rightarrow y = -x$ $x > 2, y < 1 \rightarrow y = x - 2$		۲ ۴
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الف) $f(x) = x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}}$ $\sqrt{x + \frac{1}{x}} = t \rightarrow f(x) = t^2 + 2t$ $\max_t = \infty \rightarrow f(x) = \infty$ $\min_t = \sqrt{2} \rightarrow f(x) = 2 + 2\sqrt{2}$ $-\frac{1}{\sqrt{2}} = t \rightarrow \infty$	ب) $y = -\sin^2 x + 2\sin x + 3$ $\max_{\sin x} = 1 \rightarrow y = 4$ $\min_{\sin x} = -1 \rightarrow y = 0$ $-\frac{1}{10} = \sin x \rightarrow y = 4$	$R_f \in [2 + 2\sqrt{2}, \infty)$ $R_f \in [0, 4]$	۲ ۵
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$$\{1, 2, \dots, 9\} = \text{اعداد طبیعی یک رقمی}$$

$$R_{f(961)} = -\frac{1+2+\dots+9}{9} + 9(10) = 90 - 15 = 75$$

$$f(x) = \sqrt{ax^2 + bx + c}, D_f = [2, +\infty) \rightarrow f \text{ تابع است} \rightarrow a=0, f(2)=0, f(3)=1$$

$$\rightarrow 2b+c=0, 3b+c=1 \rightarrow b=1, c=-2 \rightarrow g(x) = \sqrt{bx^2 - ax - 2c}$$

$$\rightarrow g(x) = \sqrt{x^2 + 4} \quad , \quad R_{x^2+4} \in [2, +\infty) \rightarrow R_g = \sqrt{[2, +\infty)} = [2, +\infty)$$

$$f(x) = \frac{x^3 - 4x}{x+2} \rightarrow D_f \in \mathbb{R} - \{-2\} \rightarrow a=1, b=-2$$

$$\frac{x^3 - 4x}{x+2} = \frac{x(x+2)(x-2)}{x+2} = x^2 - 4 \rightarrow R_{x^2-4} \in [-2, +\infty) \rightarrow R_f = R_{x^2-4} - f(-2)$$

$$\rightarrow R_f = [-2, +\infty) - \{1\} \rightarrow f\left(\frac{a+b}{2}\right) = f(1) = 0$$

صفحه آخر...

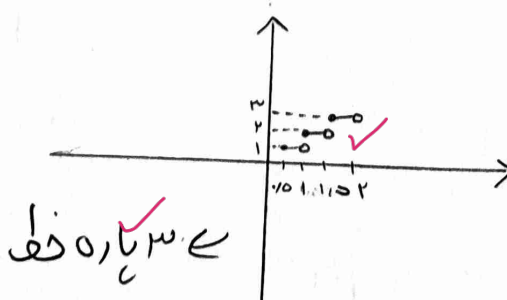
$$a=-4, b=12 \leftarrow x^3 + ax^2 + bx - 8 = (x-2)^3 \quad \leftarrow \text{تابع قطعی است}$$

$$y = \sqrt[3]{(x-2)^3} = x-2, D_f = [-4, 12] \rightarrow R_f = [-2, 10]$$

$$x \in [\frac{1}{2}, 1) \rightarrow y=1$$

$$x \in [1, 1.5) \rightarrow y=2$$

$$x \in [1.5, 2) \rightarrow y=3$$



$$f(n) = \frac{n(n-2)(n+2)}{n+2} = n^2 - 2n$$

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$$n^2 - 2n \neq 8 \rightarrow \begin{cases} n \neq -2 \\ n \neq 4 \end{cases}$$

۸ = ۸ درجه تکایع نیست یعنی :

پس دامنه پذیر است : $D_f = \mathbb{R} - \{-2, 4\}$

$$f(n) = n^2 - 2n \rightarrow \lim_{n \rightarrow -1} \Rightarrow R_f = [-1, +\infty) - \{8\}$$

حالا بیایم سراغ برد :

$$f\left(\frac{a+b}{2}\right) = f\left(\frac{2}{-2}\right) = f(-1) \rightarrow f(-1) = \textcircled{3}$$