

الف) $f(x) = 2 \sin^2(x + \frac{\pi}{3}) - 1$ $ax^2 + bx + c$ $\begin{cases} \min = -1 \rightarrow 1 \\ \max = 1 \rightarrow 1 \\ -\frac{b}{2a} = 0 \rightarrow -1 \end{cases}$ $RP = [-1, 1]$	ب) $g(x) = 2 \cos^3 x - 4$ $\cos^3 x \begin{cases} \min = -1 \rightarrow -7 \\ \max = 1 \rightarrow -1 \end{cases}$ $Rg = [-7, -1]$	۲
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$\frac{x}{ x } + [x]$ $\begin{matrix} x & y \\ [-3, -2) \rightarrow -4 \\ [-2, -1) \rightarrow -3 \\ [-1, 0) \rightarrow -2 \\ (0, 1) \rightarrow 1 \end{matrix}$	$\begin{matrix} x & y \\ [1, 2) \rightarrow 2 \\ [2, 3) \rightarrow 3 \\ \{3\} \rightarrow 4 \end{matrix}$		۲
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$y = \left \frac{4x+1}{x+3} \right$ $\frac{4x+1}{x+3}$ $\begin{cases} \text{میان قاطع} = -3 \\ \text{کلب افقی} = \frac{a}{c} = 4 \end{cases}$ $ad - bc = 12 - 1 = 11 > 0$		۳
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$x-2 + y-1 = 3$ $\begin{cases} -1 \leq x < 2 \rightarrow -x \\ -1 \leq x < 2 \rightarrow x \\ 2 \leq x \leq 5 \rightarrow x-4 \\ 2 \leq x \leq 5 \rightarrow 4-x \end{cases}$		۴
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الف) $x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}} =$ $(\sqrt{x + \frac{1}{x}} + 1)^2 - 1$ $\begin{cases} \min = 1 \\ \max = \infty \end{cases}$ $R = [0, \infty)$	ب) $(3 - \sin x)(1 + \sin x) =$ $-\sin^2 x + 2 \sin x + 3$ $\sin x \begin{cases} -1 \rightarrow 0 \\ 1 \rightarrow 4 \\ -\frac{b}{2a} = 1 \end{cases}$ $R = [0, 4]$	۵
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$$f(n) = -\frac{1}{p}n + 10 \rightarrow f(1) + f(2) + \dots + f(9) = 9(10) - \frac{1+2+\dots+9}{p} \quad (r)$$

$$Df = \{1, 2, 3, \dots, 9\} = 90 - 10 = 80 \quad \text{Vow} \quad \frac{1 \times 2 \times \dots \times 9}{1 \times 2 \times \dots \times 9} = 10 \quad 6$$

$$Df = [1, 2 + \infty) \rightarrow f(n) = \sqrt{\dots} \rightarrow \frac{a}{b} \quad (r)$$

$$f(1) = 0 \rightarrow pb + c = 0$$

$$f(2) = 1 \rightarrow 4b + c = 1 \quad \left. \begin{array}{l} b = 1 \\ c = -4 \end{array} \right\}$$

$$g(n) = \sqrt{n^2 + 4}$$

$$Rg = \sqrt{[1, 2 + \infty)} = [2, 2 + \infty) \quad y$$

$$f(n) = \frac{n(n+1)(n-1)}{(n+1)} \quad Df = \mathbb{R} - \{a, b\} \quad f\left(\frac{a+b}{2}\right) =$$

$$L = x^2 - 2x \quad Rf = [1, 2 + \infty) - \{1\} \quad f(-1) =$$

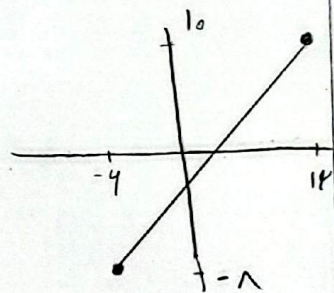
$$x_1 = 1, y_1 = -1 \quad -1 \leftarrow$$

$$x^2 - 2x = 1 \quad (n+1)(n-1) = 0 \quad \left. \begin{array}{l} n = -1 \\ n = 1 \end{array} \right\} \rightarrow b = 1 \quad 1$$

$$y = \sqrt{ax^2 + bx + c} = \sqrt{(x-1)^2} = x - 1$$

$$x^2 - 4x^2 + 12x - 1 \rightarrow \begin{cases} a = -4 \\ b = 12 \end{cases}$$

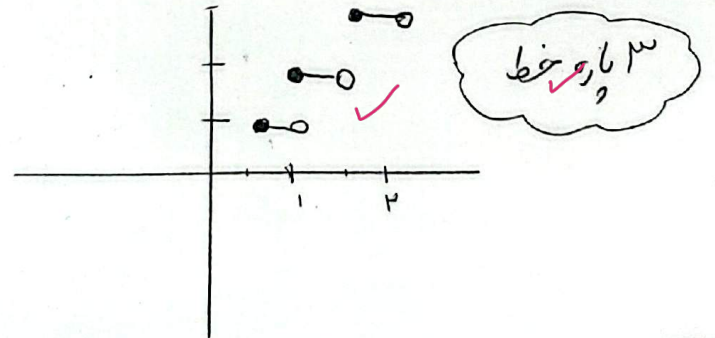
$$D = [-4, 12] \quad (r)$$

$$R = [-1, 10] \quad 9$$


$$[n] + [n + \frac{1}{p}]$$

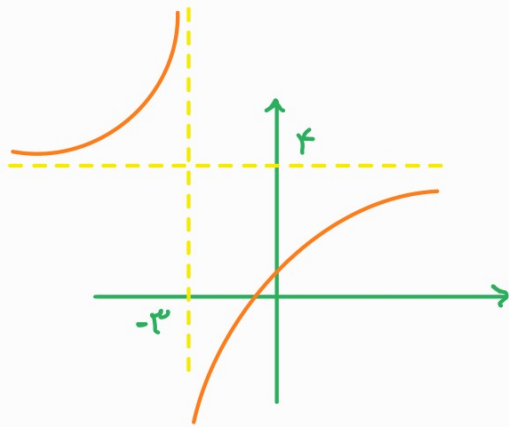
$$[\frac{1}{p}, 1) \rightarrow 0 + 1 = 1$$

$$[1, 1 + \frac{1}{p}) \rightarrow 1 + 1 = 2$$

$$[1 + \frac{1}{p}, 2) \rightarrow 1 + 2 = 3$$


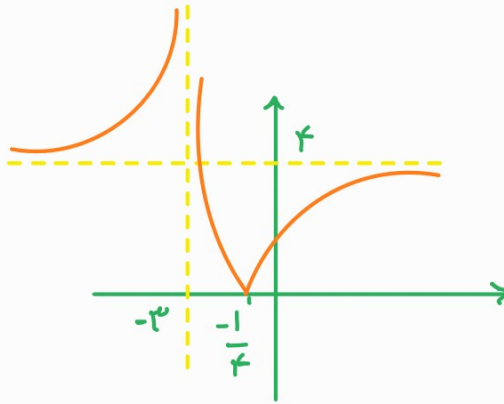
$$(r)$$

$$y = \frac{x^2 + 1}{x + 3}$$



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$$y = \left| \frac{x^2 + 1}{x + 3} \right|$$



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

$$\begin{cases} \min \square = \sqrt{2} \rightarrow f(x) = 2 + 2\sqrt{2} \\ \max \square \sim \infty \rightarrow f(x) = +\infty \\ \square = -\frac{b}{2a} = -1 \quad x \end{cases}$$

$$\Rightarrow R_f = [2 + 2\sqrt{2}, +\infty)$$