

$$f(x) = 3 \cos^2 x - 2$$

$$-1 \leq \cos x \leq 1$$

$$-1 \leq \cos^2 x \leq 1$$

$$-3 \leq 3 \cos^2 x \leq 3$$

$$-5 \leq 3 \cos^2 x - 2 \leq 1$$

$$R_f = [-5, 1]$$

(ب)

$$f(x) = 2 \sin^2 \left(x + \frac{\pi}{4} \right) - 1$$

$$0 \leq \sin^2 x \leq 1$$

$$0 \leq 2 \sin^2 x \leq 2$$

$$-1 \leq 2 \sin^2 \left(x + \frac{\pi}{4} \right) - 1 \leq 1$$

$$R_f = [-1, 1]$$

(الف)

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

$$D_f = [-3, 3]$$

$$-3 \leq x < -1 \rightarrow -1 - 3 = -4$$

$$-1 \leq x < 1 \rightarrow -1 - 1 = -2$$

$$1 \leq x < 3 \rightarrow 1 - 1 = 0$$

$$x \geq 3 \rightarrow 1 - 3 = -2$$

$$-3 \leq x < -1 \rightarrow -1 - 3 = -4$$

$$-1 \leq x < 1 \rightarrow -1 - 1 = -2$$

$$1 \leq x < 3 \rightarrow 1 - 1 = 0$$

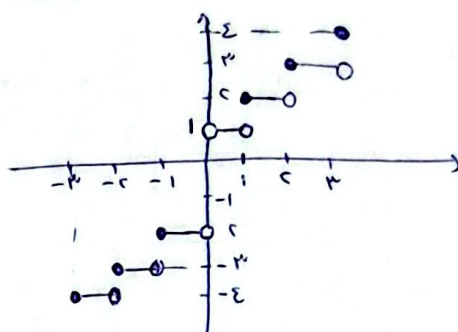
$$x \geq 3 \rightarrow 1 - 3 = -2$$

$$-3 \leq x < -1 \rightarrow -1 - 3 = -4$$

$$-1 \leq x < 1 \rightarrow -1 - 1 = -2$$

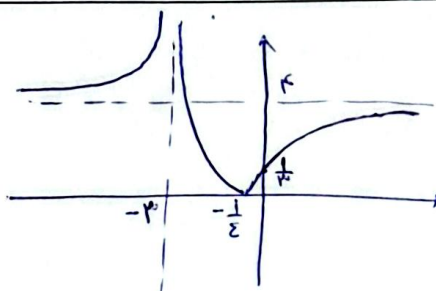
$$1 \leq x < 3 \rightarrow 1 - 1 = 0$$

$$x \geq 3 \rightarrow 1 - 3 = -2$$



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



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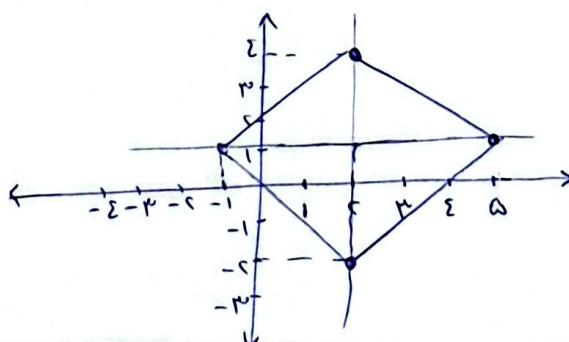
$$|x-2| + |y-1| = 3$$

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

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

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

$$x < 2, y < 1 \rightarrow y = -x$$



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$$y = (3 - \sin x)(1 + \sin x) = -\sin^2 x + 2 \sin x + 3$$

$$\sin x \rightarrow \max \rightarrow 1 \rightarrow -1 + 2 + 3 = 4$$

$$\sin x \rightarrow \min \rightarrow -1 \rightarrow -1 - 2 + 3 = 0$$

$$\sin x \rightarrow \frac{-b}{2a} \rightarrow \frac{1}{2} \rightarrow -\frac{1}{4} + 1 + 3 = 3.75$$

$$R_f = [0, 4]$$

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

$$b^2 + c^2$$

$$t \rightarrow \max \rightarrow +\infty$$

$$t \rightarrow \min \rightarrow \sqrt{c}$$

$$t \rightarrow \frac{-b}{2a} \rightarrow x$$

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

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$$f(n) = -\frac{1}{p}n + 10 \quad Df = \{1, 2, 3, \dots, 9\}$$

$$-\frac{1}{p} \left(\underbrace{1+2+3+\dots+9}_{\Sigma \Delta} \right) + 90 = -\frac{1}{p} \times \Sigma \Delta + 90 = -10 + 90 = \boxed{70}$$

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

$$Df = [r, +\infty) \rightarrow \begin{cases} a=0 \\ rb+c=0 \end{cases}$$

$$f(r)=1 \rightarrow rb+c=1 \rightarrow \begin{cases} b=1 \\ c=-r \end{cases}$$

$$g(x) = \sqrt{x^r + \Sigma}$$

$$R = [\Sigma, +\infty) \rightarrow \boxed{Rg = [r, +\infty)}$$

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$$f(x) = \frac{x^r - \Sigma x}{x + c} = \frac{x(x-c)(x+c)}{x+c} = x(x-c)$$

$$\begin{cases} a=-r \\ b=\Sigma \end{cases}$$

$\frac{-r}{\Sigma}$ اینست منفرج است $\frac{c}{\Sigma}$ معکوس است که کج، $\frac{1}{\Sigma}$ می کند و $\frac{1}{\Sigma}$ در بد نیست پس Σ باید در دانه باشد

$$x^r - cx \rightarrow y_S = -1 \rightarrow \boxed{C = -1}$$

$$f\left(\frac{\Sigma - r}{-p}\right) = \boxed{f(-1) = 3}$$

جواب

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$$x^r + ax^r + bx - 1 = (x-c)^r = x^r - cx^r + \Sigma x - 1$$

$$\begin{cases} a=-r \\ b=\Sigma \end{cases}$$

$$Df = [-r, \Sigma]$$

$$y = \sqrt[r]{(x-c)^r} = x-c \rightarrow \begin{cases} x=-r & y=-\Sigma \\ x=\Sigma & y=r \end{cases}$$

$$\boxed{Rf = [-\Sigma, r]}$$

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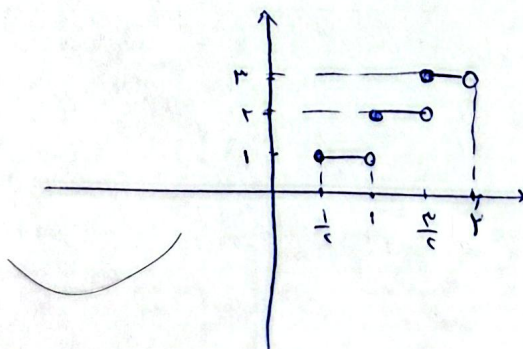
$$y = \lfloor x \rfloor + \left\lfloor x + \frac{1}{c} \right\rfloor$$

$$Df = \left[\frac{1}{c}, c \right)$$

$$\frac{1}{p} \leq x < 1 \rightarrow 0+1=1$$

$$1 \leq x < \frac{r}{c} \rightarrow 1+1=r$$

$$\frac{r}{c} \leq x < r \rightarrow 1+r=3$$



$\frac{r}{c}, 1, 3$ خط

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