

الف) $(x + \frac{x}{3}) = \theta \Rightarrow -1 \leq \sin \theta \leq 1 \Rightarrow 0 \leq \sin^2 \theta \leq 1 \Rightarrow -1 \leq 2 \sin^2 \theta - 1 \leq 1$

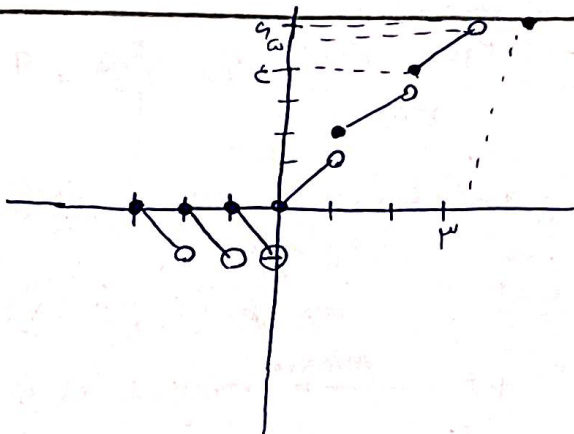
$\Rightarrow R_f = [-1, 1]$

(1)

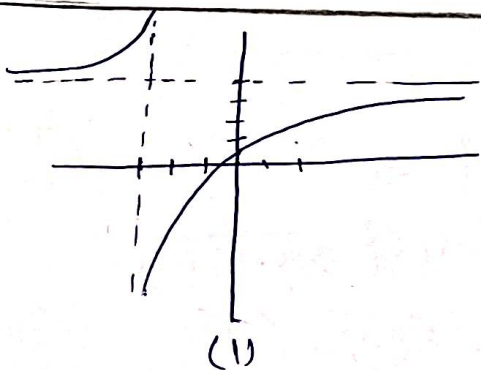
ب) $3 \cos^3 x - 4 \Rightarrow -1 \leq \cos^3 x \leq 1 \Rightarrow -1 \leq 3 \cos^3 x - 4 \leq -1$

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

$-3 \leq x < -2$	$-x-3$
$-2 \leq x < -1$	$-x-2$
$-1 \leq x < 0$	$-x-1$
$0 \leq x < 1$	x
$1 \leq x < 2$	$x+1$
$2 \leq x < 3$	$x+2$
$x=3$	$x+3=6$



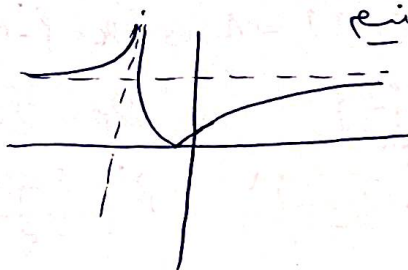
(2)



(1)

اول تابع همگونی $\frac{4x+1}{x+3}$ را رسم می کنیم

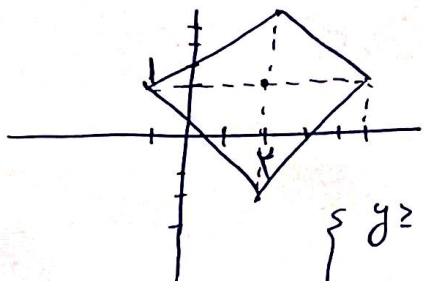
حال قدر مطلق را اعمال می کنیم



(3)

$A \mid \begin{matrix} a \\ b \end{matrix}$
 $\downarrow$
 12
 11

ضابطه: $|x-2| + |y-1| = 3$ به از $|x-a| + |y-b| = k$ (4)
 که نصف قطر مربع است



حال برای ضابطه بندی؟

$\begin{cases} y \geq 1 & y = 4 - (x-2) \\ y < 1 & y = (x-2) - 2 \end{cases}$	$\begin{cases} x \geq 2 & 4-x \\ x < 2 & x+2 \end{cases}$
	$\begin{cases} x \geq 2 & x-4 \\ x < 2 & -x \end{cases}$

$$\text{الف) اول باقی} \rightarrow \frac{n^2+1}{n} \geq 0 \rightarrow \boxed{n > 0} \xrightarrow[\text{میانگین هندسی}]{\text{میانه}} n + \frac{1}{n} \geq 2 \Rightarrow [2 + 2\sqrt{2}, +\infty) = \mathbb{R}_f$$

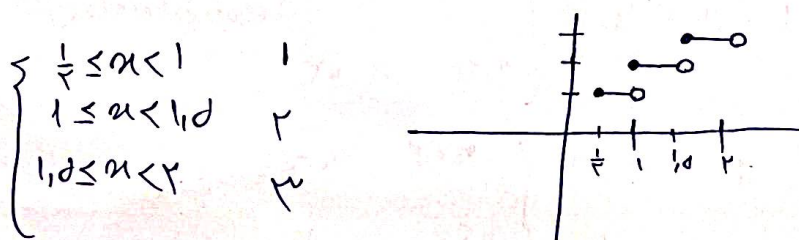
$$\text{ب) } -\sin^2 + 2\sin x + 3 = y \Rightarrow \begin{cases} \sin x = -\frac{b}{2a} = \frac{-2}{-1} = 1 \rightarrow y = 4 \\ \sin x = 0 \rightarrow y = 3 \\ \sin x = -1 \rightarrow y = 2 \end{cases} \Rightarrow \text{برای } R_f = [2, 4]$$

$$\text{ج) مجموع اعداد} = -\frac{1}{2^0}(1) + 10 - \frac{2}{2^1} + 10 - \frac{4}{2^2} + 10 + \dots - \frac{9}{2^9} + 10 = (9 \times 10) + \left(\frac{-(1+2+4+\dots+9)}{2^9} \right) = 90 - \frac{45}{2^9} = 90 - 10 = \boxed{80}$$

$$\begin{aligned} D_f &= [2, +\infty) \Rightarrow an^2 + bn + c \Rightarrow a=0 \rightarrow \boxed{2b+c=0} \\ f(1) &= 1 \Rightarrow \boxed{b+c=1} \\ &\Rightarrow \boxed{b=1}, \boxed{c=-2} \\ \Rightarrow g(n) &= \sqrt{n^2} + \varepsilon \xrightarrow{\min x=0} \min y = \sqrt{2} = 2 \Rightarrow \text{برای } R_f = [2, +\infty) \end{aligned}$$

$$\begin{aligned} \frac{n^2-\varepsilon n}{n+2} &= \frac{n(n-2)(n+2)}{n+2} = n(n-2) = 1 \Rightarrow x = \{-2, 4\} \Rightarrow \\ &\hookrightarrow D_f = \mathbb{R} - \{-2\} \\ &\hookrightarrow n^2 - 2n \xrightarrow{\text{برای}} [-1, +\infty) \rightarrow \boxed{c=-1} \\ D_f &= \mathbb{R} - \{-2, 4\} \Rightarrow \boxed{a=-2, b=4} \\ f\left(\frac{4-2}{-2}\right) &= f(-1) = \boxed{3} \end{aligned}$$

$$\begin{aligned} \text{چون } y &= \sqrt[3]{(n+1)^3} = n+1 \Rightarrow R_f = [-1, 10] \\ &\hookrightarrow n^3 - 9n^2 + 17n - 1 \rightarrow \begin{cases} a=-9 \\ b=17 \end{cases} \Rightarrow D_f = [-9, 17] \end{aligned}$$



۱۰ سه تا محدوده