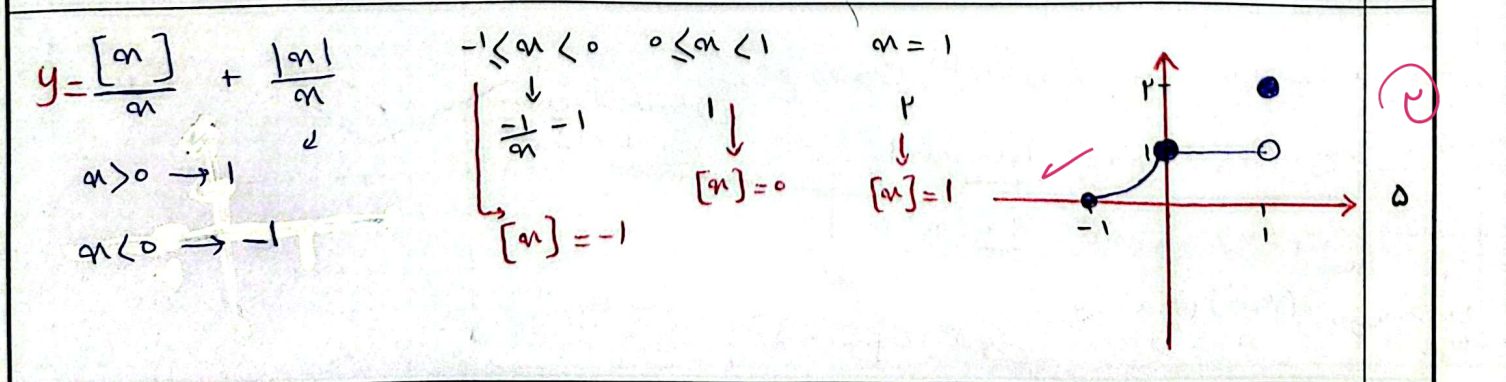


$f(n+1) + f(n+2) = 3n + f(3)$ $\xrightarrow{n=1} f(2) + f(3) = 3 + f(3)$ (۱.۵)
 $f(n) \rightarrow$ تابع خطی $\Rightarrow an + b$
 $\Rightarrow f(3) = 3$ (۱.۵)
 $y = \sqrt{f(n) - n^2} = \sqrt{n - n^2}$ بروزیجی
 $\frac{-b}{2a} = \frac{1}{2} \rightarrow \frac{1}{2} - \frac{1}{2} = \frac{1}{2}$ (۱.۵)
 $3a + 2b = 3$ $f(n) = n$ (۱.۵)
 $3a + 2b = 3 \rightarrow 3a = 3 \rightarrow a = 1$ (۱.۵)
 $3a + 2b = 3 \rightarrow 3 + 2b = 3 \rightarrow 2b = 0 \rightarrow b = 0$ (۱.۵)

$f(n) = \frac{n^3 - 4n}{n+2} = \frac{n(n-2)(n+2)}{n+2} = \frac{n(n-2)}{1}$ (۲)
 $y = n^2 - 2n \rightarrow (-2)^2 - 2(-2) = 8$ (۲)
 f بر تابع $= \frac{-b}{2a} = 1$ (۲)
 $Rf = [-1, +\infty) - \{8\}$ (۲)
 $f\left(\frac{a+b}{2c}\right) = f\left(\frac{-2+4}{-2}\right) = f(-1) = \frac{(-1)^3 - 4(-1)}{-1+2} = \frac{-1+4}{1} = 3$ (۲)

$y = \sqrt[3]{n^3 + an^2 + bn - 8}$ (۳)
 $n^3 - 6n^2 + 12n - 8 = (n-2)^3$ (۳)
 $\Rightarrow n^3 = 8$ (۳)
 $Df = [a, b] = [-4, 12] \rightarrow -2 \leq n \leq 12 \rightarrow -8 \leq n-2 \leq 10$ (۳)
 $Rf = [-8, 10]$ (۳)

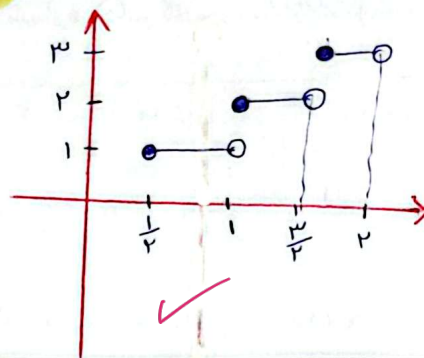
$y_1 = \left(\frac{n+1}{1-n}\right)^{\frac{1}{a}} \rightarrow Df \rightarrow \frac{n+1}{1-n} > 0 \rightarrow \frac{-1}{-1+1} = [-1, 1)$ (۴)
 $y_2 = \frac{an^2 - 1}{n^2 + b} \rightarrow \frac{a}{n^2} = \frac{yb+1}{a-y} \rightarrow \frac{-1}{-1+1} = [-1, 1)$ (۴)
 $a+b = 1+1 = 2$ (۴)



از ۳ پاره خط تشکیل شده

$$y = [x] + \left[x + \frac{1}{x}\right]$$

- ① $\frac{1}{x} \leq x < 1 \rightarrow [x] = 0 \rightarrow \left[x + \frac{1}{x}\right] = 1 \rightarrow y = 1$
- ② $1 \leq x < \frac{3}{2} \rightarrow [x] = 1 \rightarrow \left[x + \frac{1}{x}\right] = 1 \rightarrow y = 2$
- ③ $\frac{3}{2} \leq x < 2 \rightarrow [x] = 1 \rightarrow \left[x + \frac{1}{x}\right] = 2 \rightarrow y = 3$



۶

$$y = \left| \frac{x+1}{ax+3} \right| < 1 \rightarrow \text{جانب افقی} = 1 \rightarrow \frac{1}{a} = 1 \rightarrow a = 1$$

فرض $\frac{b+1}{b+3} = 1$

$f(b) = 1 \rightarrow \left| \frac{b+1}{b+3} \right| = 1$

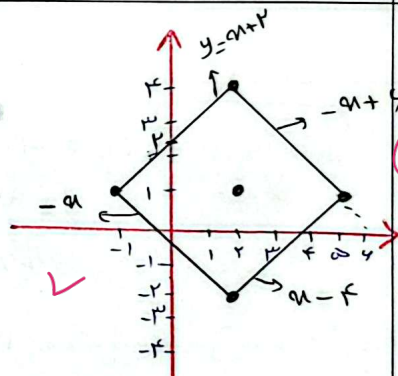
$\frac{b+1}{b+3} = -1 \rightarrow b+1 = -b-3 \rightarrow 2b = -4 \rightarrow b = -2$

$a-b = 1 - (-2) = 3$

۷

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

- ① $x \geq 2, y \geq 1 \rightarrow x-2+y-1=3 \rightarrow y = -x+6$
- ② $x \geq 2, y \leq 1 \rightarrow x-2+1-y=3 \rightarrow y = x-4$
- ③ $x \leq 2, y \geq 1 \rightarrow 2-x+y-1=3 \rightarrow y = x+2$
- ④ $x \leq 2, y \leq 1 \rightarrow 2-x+1-y=3 \rightarrow y = -x$



۸

ب) $|x-1| - |y-2| = -3$

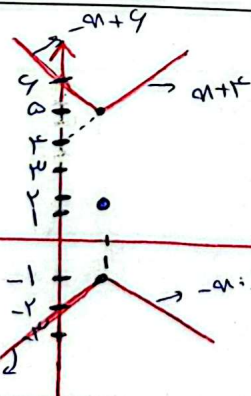
$x(-1) \rightarrow |y-2| - |x-1| = 3$

$y-2-x+1=3 \rightarrow y = x+4$

$y-2+x-1=3 \rightarrow y = -x+6$

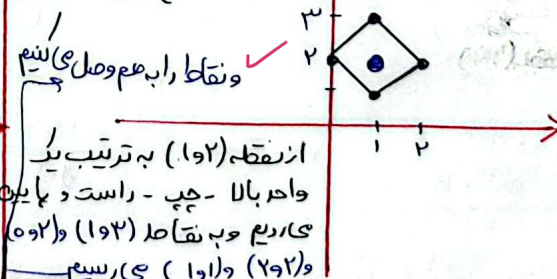
$-y+2-x+1=3 \rightarrow y = -x$

$-y+2+x-1=3 \rightarrow y = x-2$



الف) $|x-1| + |y-2| = 1$

مربع است



۹

$$y = 3x + |ax+b|$$

برای تابع در صورتی که R باشد، شیب این دو خط هم علامت شود.

عبارت درون قدر مطلق

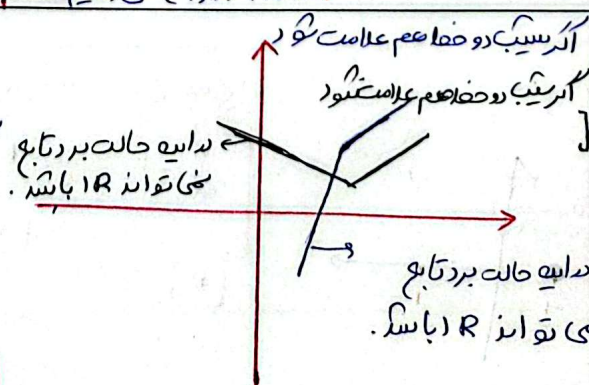
$3x + ax + b \rightarrow (3+a)x + b$

عبارت درون قدر مطلق منفی

$3x - ax - b \rightarrow (3-a)x - b$

$(3+a)(3-a) > 0$

$9 - a^2 > 0 \rightarrow 9 > a^2 \rightarrow -3 < a < 3$



۱۰