

$$f(x) = ax + b$$

$$f(rx+1) + f(x+r) = rx + f(r)$$

$$(r(x+1)+b) + a(x+r)+b = rx + ra+b$$

$$ax+a+b + ax+ra+b = rx + ra+b$$

$$ax + \frac{r}{a} + rb = rx + \frac{r}{a} + b$$

$$\rightarrow ra + b = rx \Rightarrow a=1, b=0 \Rightarrow f(x)=x$$

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

$$\rightarrow Df \quad x+r \neq 0 \Rightarrow x \neq -r$$

$$\rightarrow \frac{x(x-r)}{x+r}$$

$$= x(x-r) = x(x-r) = x^r - rx$$

$$\Rightarrow \min: \frac{-b}{ra} = \frac{r}{r} = 1$$

$$\Rightarrow y = \min = -1$$

$$IRF [-1, +\infty)$$

$$\frac{f(-r)}{+rx(-1)} = (-1) \rightarrow (-1, +\infty)$$

$$x(x-r) \xrightarrow{x \neq -r} y \neq 1$$

$$x^r - rx \neq 1 \rightarrow x^r - rx - 1 \neq 0$$

$$(x-r)(x+r)$$

$$y = \sqrt{x^r + ax^r + bx - 1}$$

$$= x - r$$

$$\rightarrow DF [-r, 1r]$$

$$\rightarrow RF = [-1, 1]$$

$$\left(\frac{x+1}{1-x} \right)^{1/2}$$

$$\rightarrow \frac{x+1}{1-x} > 0$$

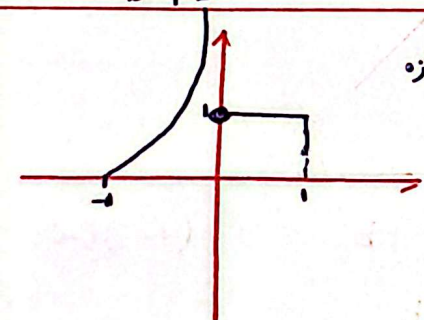
$$\frac{-1}{-1} + \frac{1}{1} = 0$$

$$[-1, 1] = DF$$

$$\Rightarrow \frac{ax^r - 1}{x^r + b}$$

$$\rightarrow \left(\frac{-1}{b}, a \right)$$

$$\Rightarrow b=1, a=1$$



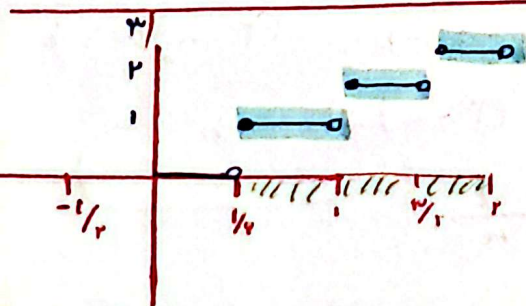
$$x \leq 1 \rightarrow [x] = 0 \Rightarrow \frac{[x]}{x} = 0$$

$$\rightarrow |x| = x \Rightarrow \frac{[x]}{x} = 1$$

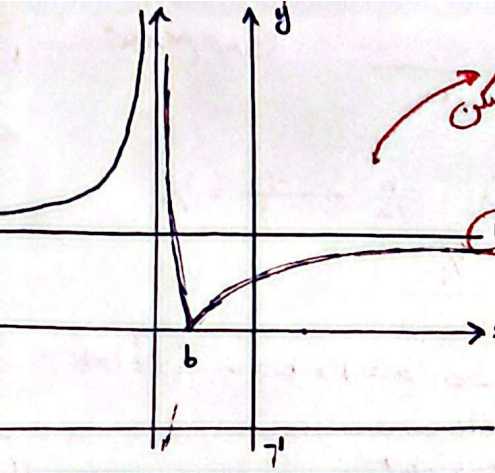
$$x+1=1$$

$$-1 \leq x < 0 \rightarrow [x] = -1 \Rightarrow \frac{[x]}{x} = -1/x$$

$$\rightarrow |x| = -x \Rightarrow \frac{[x]}{x} = \frac{-x}{x} = -1$$



$$f(x) = \frac{[x]}{x}$$



حالت ممکن

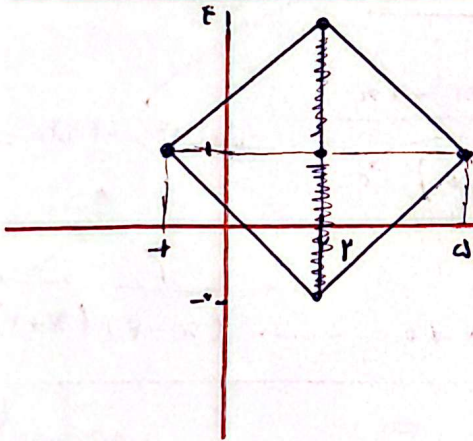
$$\left| \frac{x+1}{x+3} \right|$$

$$\frac{1}{a} = 1 \Rightarrow a = 1$$

$$\text{if } a = 1 \quad \left| \frac{x+1}{x+3} \right| \leq 1$$

$$-1 \leq \frac{x+1}{x+3} \leq 1 \Rightarrow b = -1$$

$$a - b = 1 + 1 = 2$$



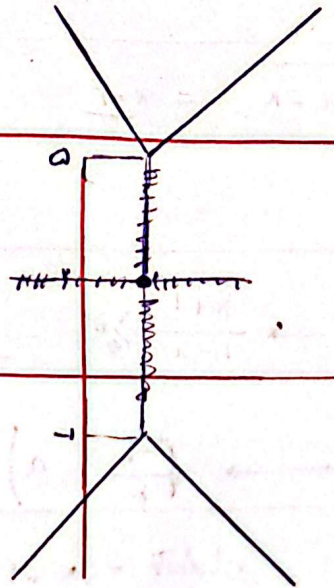
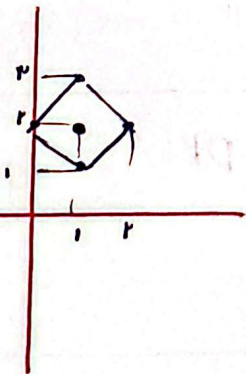
$$(1) \quad x > 1, y > 1 \quad g = 2 - x$$

$$(2) \quad x < 1, y > 1 \quad g = x + 1$$

$$(3) \quad x < 1, y < 1 \quad g = -x$$

$$x > 1, y < 1 \quad g = x - 1$$

سوال (۸)



سوال (۹)

$$-\frac{b}{a}$$

- | +

$$ax + b \geq 0 \rightarrow rx + ax + b$$

$$= (r+a)x + b$$

$$ax + b \leq 0 \rightarrow rx - ax - b = (r-a)x - b$$

$$\frac{-b}{a} \rightarrow (r+a)\frac{-b}{a} + b = (r-a)\frac{-b}{a} - b$$

$$(r+a)(r-a) \geq 0$$

$$\rightarrow \frac{r}{-} \frac{a}{+} \rightarrow \frac{-rb}{a} = \frac{-ra}{a}$$

سوال (۱۰)