

۱- صورت باید یا منفی یا صفر باشد چون در صورت + بودن صورت داریم در $\mathbb{R}$ بیرون نیست

$$\Delta = (m+3)^2 - 12m = (m-3)^2 \rightarrow \Delta = 0 \rightarrow (m-3)^2 = 0 \rightarrow m=3$$

غیر ۰ $\Delta < 0 \rightarrow (m-3)^2 < 0$

$$\frac{\sqrt{6x^2+6x+3} \times \sqrt{6}}{\sqrt{6x^2+a^2} \times \sqrt{6}} = \frac{1 \times 6x+3}{\sqrt{6} \sqrt{6x^2+a^2}} \xrightarrow{x \rightarrow \infty} \frac{3}{\sqrt{6} a^2}$$

این نتیجه است $\left\{ \begin{array}{l} a^3+a^2=0 \\ a=0 \\ a=-1 \end{array} \right.$

$$f(a) = \frac{2 \pm \tan b}{a \leftarrow \sqrt{-a}} = \frac{3}{\sqrt{6} a^2} \rightarrow \tan b = \sqrt{3} \rightarrow (b = \frac{\pi}{3})$$

۲- $f(x) = \mathbb{R} - \{1\} \rightarrow f(1) = \frac{1+a+b}{1-1} = \frac{0}{0} \rightarrow 1+a+b=0$ I

$$ax^2 - ax + b = 0 \xrightarrow{x=1} \text{II } a - a + b = 0 \quad \text{I, II} \rightarrow \begin{cases} a=2 \\ b=-3 \end{cases} \left[\frac{b-2a}{3} \right] = \left[\frac{-7}{3} \right] = -\frac{7}{3}$$

$$x=1 \Rightarrow \tan \frac{\pi}{6} = \frac{|x^2+x-2|}{a(1-x)} = \frac{|x-1||x+2|}{a(1-x)} \Rightarrow -1 = \frac{3}{a} \rightarrow a=3$$

$$a=3: x=a \Rightarrow b(a-(-a)) = \frac{21}{-12} \rightarrow b = -\frac{7}{4} \quad ab = 3 \times \frac{7}{4} = \frac{21}{4}$$

$$f(x) = a[x] + a + b[x] + b[a] + b = (a+b)[x] + a + b + b[a]$$

$$\rightarrow a+b=0 \rightarrow a=-b \quad \frac{a[a]}{f(a)} = \frac{a[a]}{a+b+b[a]} = \frac{a[a]}{-a[a]} = -1$$

$\Rightarrow b=0 \rightarrow f(x) = -2a$

$$\frac{a}{f(b)} = \frac{a}{-2a} = -\frac{1}{2}$$

$$\frac{2x+m}{-1} = 2 \rightarrow 2a+m = -2 \rightarrow a = \frac{-2-m}{2}$$

$$\begin{cases} a^2 + ma + n = 0 \\ 6a^2 + 2am + n = 0 \end{cases} \Rightarrow 3a^2 + am = 0 \rightarrow \begin{cases} a = -\frac{m}{3} \\ a = 0 \end{cases}$$

$a=0$ غرض چون $f(3a) = f(0) \neq 10$

$$\frac{-2-m}{2} = \frac{-m}{3} \rightarrow 2m+3m \rightarrow m=-6, a=2 \quad \begin{cases} 2-12+n=0 \\ n=10 \end{cases}$$

$$n-m=16$$

$$[x] + [-x] \begin{cases} x \notin \mathbb{Z} \rightarrow -1 \checkmark \\ x \in \mathbb{Z} \rightarrow 0 \end{cases} \rightarrow \begin{cases} a^r - 1 = 1 - a \rightarrow ra^r + a - r = 0 \rightarrow a = -1 - \checkmark \\ a = \frac{r}{\mu} \end{cases}$$

$$\text{if } a = -1 \rightarrow f(x) = \begin{cases} -r & x \notin \mathbb{Z} \\ b \sin(-\pi) & x \in \mathbb{Z} \end{cases}$$

$$b \sin(-\pi) = 0 \neq -r \rightarrow a = -1 \text{ is not possible}$$

$$\text{if } a = \frac{r}{\mu} \quad f(x) = \begin{cases} -\frac{1}{\mu} & x \notin \mathbb{Z} \\ b \sin(\frac{\pi}{\mu}) & x \in \mathbb{Z} \end{cases}$$

$$b \sin(\frac{\pi}{\mu}) = \frac{\sqrt{r}}{r} \quad b = -\frac{1}{\mu} \rightarrow$$

$$b = \frac{-r}{r\sqrt{r}}$$

$$\frac{a}{b} = \frac{\frac{r}{\mu}}{\frac{-r}{r\sqrt{r}}} = -\frac{\sqrt{r}}{\mu}$$

$$\frac{|x-1| |x| |x+m+1|}{|x-1| (m(x+1)+1)} \xrightarrow{x=1} \frac{|r+m|}{rm+1} = \frac{m}{m+r}$$

$$\begin{aligned} m > -r & \rightarrow (m+r)^r = rm^r + m \rightarrow -1 \\ m < -r & \rightarrow m+r < 0 \rightarrow m = -1 \end{aligned}$$

$$-(r+m)^r = rm^r + m \rightarrow -m^r - \epsilon - \epsilon m = rm^r + m \rightarrow rm^r + \Delta m + \epsilon = 0 \rightarrow \Delta < 0$$

$$\Rightarrow \text{if } m = 1 \quad \lim_{x \rightarrow 1} f(x) = \frac{|x-1| |x| |x+m+1|}{|x-1| |x| (m(x+1)+1)} = 1$$

$$\text{if } m = \epsilon \quad \lim_{x \rightarrow \epsilon} f(x) = \frac{|x-1| |x| |x+m+1|}{|x-1| |x| (m(x+1)+1)} = \frac{r}{\mu}$$

$$x=a \rightarrow a^r + ma - ra + a^r = 0 \quad f(a) = \frac{\sqrt{r} |a^r + a|}{|a^r + (m-r)a + a^r|} = \frac{\sqrt{r} |a+1|}{a^r + m - r + a^r}$$

$$\frac{x^r + m}{x^r + a|x|} = \frac{|x|+1}{|x|+a} \xrightarrow{x=0} \frac{1}{a} = \frac{ra-1}{ra+r} \rightarrow ra^r - ra - r = 0 \rightarrow \begin{cases} a = r - 1 \\ a = -\frac{1}{r} \end{cases}$$

$$\text{if } a = r \quad \lim_{x \rightarrow \frac{1}{r}} f(x) = \frac{\frac{1}{r} + 1}{\frac{1}{r} + 1} = \frac{r}{a}$$

$$\text{if } a = -\frac{1}{r} \quad \lim_{x \rightarrow -1} f(x) = \frac{\epsilon}{\epsilon-1} = r$$