

۱) ریشه زبر، رادیکال، ریشه خارج

$$\Delta = 0 \rightarrow (m+3)^2 - 4m = 0 \rightarrow m^2 - 4m + 9 = 0 \rightarrow (m-3)^2 = 0 \rightarrow m = 3$$

$$2x^3 + a^2 \xrightarrow{x=a} 2a^3 + a^2 = 0 \Rightarrow a = -\frac{1}{3}$$

$$\lim_{x \rightarrow -\frac{1}{3}} \frac{\sqrt{4(x+\frac{1}{3})^2}}{|2x^3 + \frac{1}{9}|} = \frac{\sqrt{4(x+\frac{1}{3})^2}}{2|x^3 + \frac{1}{9}|} = \frac{\sqrt{4} |x + \frac{1}{3}|}{|x + \frac{1}{3}| |x^2 - \frac{x}{3} + \frac{1}{9}|} = \frac{\sqrt{4}}{\frac{x}{3}} = \frac{2\sqrt{9}}{x}$$

$$\frac{x \tan b}{\sqrt{-x}} \xrightarrow{x=a} \frac{x \tan b}{\frac{1}{\sqrt{y}}} = \frac{x \sqrt{y}}{y} \Rightarrow x \sqrt{y} \tan b = \frac{x \sqrt{y}}{y}$$

$$\Rightarrow \tan b = \frac{\sqrt{y} \cdot b \cdot x}{y} \Rightarrow b = \frac{\pi}{4}$$

۲) یوسه نسبت و یک حد دارد، در نقطه ۱

$$\omega x^2 - ax + b = 0 \xrightarrow{x=1} \omega - a + b = 0 \Rightarrow a - b = \omega \Rightarrow a = 3,$$

$$x^2 + ax + b \xrightarrow{x=1} 1 + a + b = 0 \Rightarrow a + b = -1 \quad b = -3$$

$$\Rightarrow \left[\frac{b - \omega a}{\omega} \right] = \left[\frac{-3 - \omega}{\omega} \right] = \left[-\frac{\omega}{\omega} \right]$$

$$f(1) = f(1^+) \Rightarrow \tan \frac{\omega x}{x} = \frac{(x-i)(x+i)}{a(1-x)} \Rightarrow -1 = -\frac{\omega}{a} \Rightarrow a = \omega \quad (3)$$

$$f(\omega) = f(\omega^-) \Rightarrow b(1\omega) = \frac{-\omega}{1\omega} \Rightarrow b = -\frac{\omega}{\omega_0} \Rightarrow ab = (3)(-\frac{\omega}{\omega_0}) = \left[-\frac{\omega}{1\omega_0} \right]$$

$$f(n) = a[n] + a + b[n] + b[a] + b \quad (4)$$

در این تابع اگر عبارت $(a+b)$ ، $[n](a+b)$ ، $(a+b)$ معرک شود، تابع پیوسته است. $(a+b)$ عاقل

معرک شده است برآیند مستند. $a = -b$

$$\Rightarrow f(n) = (a-a)[n] + a - a[a] - a = -a[a]$$

$$\Rightarrow \frac{a[a]}{-a[a]} = \frac{a[a]}{f(a)} = \boxed{-1}$$

$$\boxed{b=0} \quad \leftarrow b = \text{عادل معرک شده است برآیند} \quad (5)$$

$$f(n) = -ra \Rightarrow f(a) = -ra \Rightarrow \frac{a}{-ra} = \boxed{\frac{-1}{r}}$$

$$a^r + am + n = 0 \quad \leftarrow \text{معادله} \quad a^r + ram + n = 0 \quad \leftarrow \text{معادله} \quad f(ra) = 0$$

$$\Rightarrow a^r + am + n = ra^r + ram + n \Rightarrow -ra^r - am \Rightarrow m = -ra$$

$$\Rightarrow a^r - ra^r + n = 0 \Rightarrow n = ra^r$$

$$\lim_{n \rightarrow a} \frac{n^r - ran + ra^r}{a - n} = \frac{(n-a)(n-ra)}{(a-n)} = \frac{(n-ra)}{-1} = -(n-ra) = -(a-ra) = a - r \Rightarrow a = r$$

$$\Rightarrow m = -ra = -4 \quad n = ra^r = 1 \Rightarrow n - m = 1 + 4 = \boxed{5}$$

$$\left. \begin{array}{l} n = 0^+ \Rightarrow (1-a)(0) + (ra^r - 1)(-1) = 1 - ra^r \\ n = 0 \Rightarrow b \sin \frac{\pi}{a} \\ n = 0^- \Rightarrow (1-a)(-1) + (ra^r - 1)(0) = a - 1 \end{array} \right\} \Rightarrow \begin{array}{l} 1 - ra^r = a - 1 \\ ra^r + a - r = 0 \end{array}$$

$$a + c = b \quad \rightarrow a = -1 \Rightarrow 1 - ra^r = 1 - r = -r, \quad a - 1 = -r$$

$$a = \frac{r}{p} \Rightarrow 1 - ra^r = 1 - \frac{r}{p} = -\frac{1}{p}, \quad a - 1 = -\frac{1}{p}$$

$$\Rightarrow b \sin \frac{\pi}{a} \quad a=1 \rightarrow b \sin(-\pi) = 0 \rightarrow a = -1 \quad \text{غلط} \quad \text{نظایم ازای } a=1 \quad \text{عبارت باید برابر با } (-\pi) \text{ شود.} \quad (7)$$

$$\Rightarrow a = \frac{p}{q} \Rightarrow b \sin \frac{\pi}{a} = b \sin \frac{q\pi}{p} = -b = -\frac{1}{p} \Rightarrow b = \frac{1}{p}$$

$$\Rightarrow \frac{a}{b} = \frac{\frac{p}{q}}{\frac{1}{p}} = \boxed{p}$$

$$\frac{|n^p + m - n - 1|}{m|n^p - 1| + |n - 1|} = \frac{|n - 1| |n + m + 1|}{|n - 1| (m|n + 1| + 1)} \quad (8)$$

$$n=1 \rightarrow \frac{|m+1|}{m+1} = \frac{m}{m+1}$$

$$\text{if } m < -1 \Rightarrow -m^p - km - k = pm^p + m \Rightarrow pm^p + \omega m + k = 0 \Rightarrow \Delta < 0$$

$$\text{if } m > -1 \Rightarrow m^p + km + k = pm^p + m \Rightarrow m^p - pm - k = 0$$

$$m = k \Rightarrow \lim_{n \rightarrow \frac{1}{p}} f(n) = \frac{\frac{p}{q}}{\frac{q}{p}} = \frac{p^2}{q^2} \quad \left| \begin{array}{l} m = -1 \Rightarrow \lim_{n \rightarrow -1} f(n) = 1 \end{array} \right|$$

(9) صورت خروج در ازای $(n=a)$ با مخرج برابر می شود

$$\Rightarrow \sqrt{p} |a^p + a| = 0 \Rightarrow \begin{cases} a=0 \rightarrow f(n) = 0 \quad \text{غلط} \\ a=-1 \rightarrow |-1 + (m-p) + 1| = 0 \end{cases} \quad \text{طبق صورت سوال} \quad \text{نامفروض است}$$

$$\lim_{n \rightarrow -1} \frac{\sqrt{p} |-n - 1|}{|n^p + 1|} = \frac{\sqrt{p} |n + 1|}{|n + 1| |n^p + n + 1|} = \boxed{\frac{\sqrt{p}}{p}}$$

$$\lim_{n \rightarrow 0} \frac{n^p + |n|}{n^p + a|n|} = \frac{|n| + |n|}{|n| (|n| + a)} = \frac{|n| + 1}{|n| + a} \quad (10)$$

$$\text{با مخرج مساوی} \Rightarrow \frac{pa - 1}{p(a+1)} = \frac{1}{a} \Rightarrow pa^2 - a = pa + p$$

$$\Rightarrow \left. \begin{array}{l} pa^2 - pa - p = 0 \\ a = 2 \\ a = -\frac{1}{p} \end{array} \right\} \Rightarrow \lim_{n \rightarrow \frac{1}{p}} f(n) = \boxed{\frac{p}{q}} \Rightarrow \boxed{\frac{p}{q} - \frac{1}{p}} \quad \lim_{n \rightarrow \frac{1}{p}} f(n) = \boxed{\frac{p}{q}}$$