

نام و نام خانوادگی: کوروش شیرازی فر پاسخنامه تشریحی تکلیف شماره ۲۱ کلاس ۱۱/۲/۱۳۹۵

$$\lim_{n \rightarrow a} f(n) = f(a) = \frac{2 \pm \tan b}{\sqrt{-a}}$$

$$2a^3 + (m-3)a^2 + a = 0 \Rightarrow 2a^3 + (m-1)a = 0 \Rightarrow a^2(2a + m - 1) = 0 \Rightarrow m = 1 - 2a$$

$$4a^2 + (m+3)a + \frac{m}{4} = 0 \Rightarrow 4a^2 + (1 - 2a + 3)a + \frac{1-2a}{4} = 0$$

$$\Rightarrow 4a^2 + 4a - 2a^2 - a + 1 - a = 0 \Rightarrow 2a^2 + 3a + 1 = 0 \Rightarrow (2a+1)(a+1) = 0 \Rightarrow a = -\frac{1}{2} \rightarrow m = 3$$

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

$$\begin{cases} \text{مخرج} = 0 \\ \text{صورت} = 0 \end{cases} \Rightarrow (1)^2 + (ax+1) + b = 0 \Rightarrow a + b = -1 \Rightarrow b = -1 - a$$

$$ax^2 + am + b = 0 \xrightarrow{b = -1-a} \Delta \geq 0 \Rightarrow \Delta = (-a)^2 - 4 \times a \times (-1-a)$$

$$= a^2 - (-2a - 4a^2) = a^2 + 2a + 4a^2 \rightarrow a^2 + 2a + 4a^2 = 0$$

$$\begin{cases} 1+a+b=0 \rightarrow b=-1-a \\ 5-a+b=0 \rightarrow a=2 \end{cases} \rightarrow \left[\frac{-3-2(2)}{3} \right] = \left[\frac{-7}{3} \right] = -\frac{7}{3}$$

$$\tan\left(\frac{(n+1)\pi}{\epsilon}\right) \xrightarrow{n=1} \tan\frac{\pi}{\epsilon} = -1 \quad (I)$$

$$\frac{1}{a(1-n)} \xrightarrow{1 < n < 2} \frac{n^2 + n - 2}{a(1-n)} = \frac{(n-1)(n+2)}{a(1-n)} = \frac{-(n+2)}{a} \xrightarrow{n=1} -\frac{3}{a}$$

$$(II) \quad \frac{3}{a} \quad I = II \quad \xrightarrow{\text{شرط پیوستگی}} -1 = -\frac{3}{a} \rightarrow a = 3$$

$$a=0 \rightarrow b(0 - [-a]) = 1 \cdot b \quad \xrightarrow{\text{شرط پیوستگی}} 1 \cdot b = -\frac{21}{12} \rightarrow b = -\frac{21}{12} \rightarrow a \times b = \frac{-21}{12}$$

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

$$x \rightarrow 0^+ : a[0^+] + a + b[0^+] + b[a] + b = a + b[a] + b$$

$$x \rightarrow 0^- : a[0^-] + a + b[0^-] + b[a] + b = a + b[a]$$

$$x \rightarrow 0^- \rightarrow a + b[a] + b = b[a] \rightarrow a = -b$$

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

$$[x] \text{ تابع پله‌ای } \Rightarrow b=0 \rightarrow f(n) = -2a \xrightarrow{a \neq 0} \text{ غیر صفر}$$

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

$$f(a) = b(a - [-a]) = b(a + a) = 1 \cdot b$$

$$\lim_{x \rightarrow \infty} f(x) = \lim_{x \rightarrow \infty} \frac{|e^x + 2x - 2|}{3(1-2x)} = \lim_{x \rightarrow \infty} \frac{|2x + 2 - 2|}{3(1-2x)} = \frac{-2}{12} = -\frac{1}{6}$$

$$ab = -\frac{1}{6} \quad \text{سوال ۳}$$

$$\lim_{x \rightarrow a} \frac{x^r + mx + n}{a - x} = f(a) = r \rightarrow \text{مخرج} \rightarrow \text{عدد} = 0 \rightarrow x^r + mx + n$$

$$x^r + mx + n = (x-a)(x+k) \rightarrow \frac{(x-a)(x+k)}{a-x} = -(x+k) \rightarrow \lim_{x \rightarrow a} -(x+k) = -(a+k) = r$$

$$\Rightarrow a+k = -r \rightarrow k = -a-r \Rightarrow (x-a)(x-a-r) = x^r - (r+1)x + a(r+1)$$

$$m = -(r+1) \quad n = a(r+1) \quad f(r) = 0 \Rightarrow f(a) + r m + n = 0 \Rightarrow f(a) + r(-r-1) + a(r+1) = 0$$

$$\Rightarrow f(a) - r^2 - r + ar + a = 0 \Rightarrow a(a-r) = 0 \rightarrow a = r \rightarrow m = -(r+1) = -2 \rightarrow n = 1$$

$$x \rightarrow n^- \quad \lim_{x \rightarrow n^-} f(x) = (1-a)(n-1) + (ra^r-1)(-n)$$

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

$$\Rightarrow ra^r + a - r = 0 \rightarrow (r-1)(a+1) = 0 \Rightarrow a = \frac{r}{r-1} \quad \frac{a}{a+1} = \frac{r}{r+1} \rightarrow \lim_{x \rightarrow n} 1-a = \frac{1}{r}$$

$$f(n) = b \sin\left(\frac{\pi}{a}\right) = \sin\left(\frac{\pi}{r}\right) = -1 \rightarrow f(n) = b(-1) = -b \rightarrow b = +\frac{1}{r}$$

$$\rightarrow \frac{a}{b} = +r$$

$$\lim_{x \rightarrow \frac{1}{m}} \frac{|(a-1)(x+m+1)|}{|(a-1)(x+1)| + |a-1|} = \frac{|a-1|(x+m+1)}{|a-1|(m|x+1|+1)} = \frac{|m+r|}{r_{m+1}} = \frac{m}{m+r}$$

$$m > -r \rightarrow m^r + m + r = r m^r + m \rightarrow m^r - r m - r = 0 \rightarrow \begin{cases} m = -1 \\ m = r \end{cases}$$

$$m = r \rightarrow \frac{|a^r + r - a|}{r|a-1| + |a-1|} = \frac{|a-1|(r+1)}{|a-1|(r+1)+1} \rightarrow \lim_{x \rightarrow \frac{1}{r}} \frac{r+1}{r+1} = \frac{r+1}{r} = \frac{r}{1}$$

$$m = -1 \rightarrow \frac{|a^r - 1|}{-|a-1| + |a+1|} = \frac{|a-1|}{|a-1|(-|a+1|+1)} \quad \times$$

$$x \rightarrow a \quad \text{عدد} \rightarrow 0 \quad |ax+a| = |a(x+1)| \quad x=a \rightarrow a(a+1) = 0$$

$$\Rightarrow a = -1 \quad \text{مخرج} \rightarrow 0$$

$$x^r + (m-r)x + a^r \xrightarrow{a=-1} x^r + (m-r)x + 1$$

$$x = -1 \rightarrow (-1)^r + (m-r)(-1) + 1 = 0 \rightarrow -1 - (m-r) + 1 = 0 \rightarrow m = r$$

$$\lim_{x \rightarrow -1} f(x) = \frac{\sqrt{r}|x+1|}{|x^r+1|} \rightarrow f(x) = \frac{\sqrt{r}}{|x^r+1|} \quad \lim_{x \rightarrow -1} f(x) = \frac{\sqrt{r}}{|(-1)^r+1|} = \frac{\sqrt{r}}{2}$$

$$\lim_{x \rightarrow 0^+} \frac{x^r + |x|}{x^r + a|x|} = \frac{0}{0} \rightarrow \lim_{x \rightarrow 0^+} \frac{x^r + x}{x^r + ax} = \lim_{x \rightarrow 0^+} \frac{x(x+1)}{x(a+1)} = \frac{1}{a}$$

$$\lim_{x \rightarrow 0^-} \frac{x^r + |x|}{x^r + a|x|} = \frac{0}{0} \rightarrow \lim_{x \rightarrow 0^-} \frac{x^r - x}{x^r - ax} = \lim_{x \rightarrow 0^-} \frac{x(x-1)}{x(a-1)} = \frac{-1}{-a} = \frac{1}{a}$$

$$f(1) = \frac{1-a}{1+r} = \frac{1}{a} \rightarrow 1-a = 1+r \rightarrow 1-a-1-r = 0 \rightarrow \begin{cases} a=r \\ a=\frac{1}{r} \end{cases} \quad \times$$

$$a = r \rightarrow \lim_{x \rightarrow \frac{1}{r}} f(x) = \lim_{x \rightarrow \frac{1}{r}} \frac{x^r + x}{x^r + r x} = \frac{\frac{1}{r^r} + \frac{1}{r}}{\frac{1}{r^r} + 1} = \frac{\frac{1}{r} + \frac{1}{r}}{\frac{1}{r} + 1} = \frac{\frac{2}{r}}{\frac{1+r}{r}} = \frac{2}{1+r}$$