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پرسش ایرانپور

Subject:

Year: Month: Day:

۱_ $|2x^3+(m-3)x^2+a^2| \ge 0 \xrightarrow{x=a} 2a^3+(m-3)a^2+a^2=0 \Rightarrow a^2(2a+(m-2))=0$

$a=0$, $2a=2-m$, $a=\frac{2-m}{2}$

$4x^2+(m+3)x+\frac{m}{2} \xrightarrow{x=a} 4a^2+(2-2a+3)a+\frac{2-2a}{2}$ $\quad m=2-2a$

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

$\frac{\sqrt{4x^2+(m+3)x+\frac{m}{2}}}{|2x^3+(m-3)x^2+a^2|}=\frac{\sqrt{4x^2+4x+\frac{3}{2}}}{|2x^3+\frac{1}{4}|}=\frac{\sqrt{\frac{3}{2}}\,|\cancel{2x+1}|}{|\cancel{2x+1}|\,|x^2-\frac{x}{2}+\frac{1}{4}|}$

$\Rightarrow \frac{\sqrt{\frac{3}{2}}}{|x^2-\frac{x}{2}+\frac{1}{4}|}=\frac{2\tan b}{\sqrt{-x}} \xrightarrow{x=-\frac{1}{2}} \frac{\sqrt{\frac{3}{2}}}{\frac{3}{4}}=\frac{2\tan b}{\sqrt{\frac{1}{2}}} \Rightarrow \tan b=\frac{\sqrt{3}}{3}$

$b=\frac{\pi}{6}$

۲_ $f(x)=\frac{x^2+ax+b}{x-1} \Rightarrow x=1 \Rightarrow 1+a+b=0 \Rightarrow a+b=-1$

$5x^2-ax+b=0 \xrightarrow{x=1} 5-a+b=0 \Rightarrow a-b=5$

$\left.\begin{array}{l} a+b=-1 \\ a-b=5 \end{array}\right\} \Rightarrow a=2 \quad b=-3$

$\left[\frac{b-2a}{3}\right]=\left[\frac{-3-4}{3}\right]=-3$

۳_ $f(x)=\begin{cases} \tan\frac{(x+1)\pi}{4} & x\le 1 \Rightarrow x=1 \quad \tan\frac{3\pi}{4}=-1 \\ \frac{|x^2+x-1|}{a(1-x)} & 1<x<5 \Rightarrow \frac{(x+2)\cancel{(x-1)}}{a\cancel{(1-x)}}=\frac{-x-2}{a} \xrightarrow{x=1} \frac{-3}{a}=-1 \\ b(x-[-x]) & x\ge 5 \Rightarrow x=5 \Rightarrow b\times 10=\frac{-7}{3} \Rightarrow b=\frac{-7}{30} \end{cases}$

$\Rightarrow a=3$

$x=5 \Rightarrow \frac{-7}{3}$

$a\times b=\frac{-7}{30}\times 3=-\frac{7}{10}$

۴_ $f(x)=a[x+1]+b[x+[a+1]]=a[x]+a+b[x]+b[a]+b$

$\left.\begin{array}{l} x=0^+ \Rightarrow a+b[a]+b \\ x=0^- \Rightarrow \cancel{-a}+\cancel{a}-\cancel{b}+b[a]+\cancel{b} \end{array}\right\} \Rightarrow a+b=0 \Rightarrow b=-a$

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

Arman

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$f(x) = b[x^2 - [x]] - 2a \Rightarrow b=0 \Rightarrow f(x) = -2a \qquad \frac{a}{f(x)} = \frac{a}{-2a} = -\frac{1}{2}$

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$\frac{\cancel{(a-x)}(2a-x)}{\cancel{a-x}} = 2 \xrightarrow{x=a} a=2$

$(2-x)(4-x) = x^2 - 6x + 8 \Rightarrow m=-6 \qquad n-m = 8-(-6) = 14$

$n=8$

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

$x=0 \Rightarrow f(x) = b\sin(\frac{\pi}{a})$

$x=0^- \Rightarrow f(x) = a-1$

$\Rightarrow 1-3a^2 = a-1 \Rightarrow 3a^2+a-2=0 \Rightarrow a=-1 \Rightarrow b\sin(\frac{\pi}{a}) = b\sin(-\pi)$

$a = \frac{2}{3} \Rightarrow b\sin(\frac{\pi}{a}) = b\sin(\frac{3\pi}{2})$

$\Rightarrow a=-1 \Rightarrow b\sin(-\pi) = -2$ ✗ $\qquad a=\frac{2}{3} \Rightarrow b\cancel{\sin(\frac{3\pi}{2})}^{-1} = -\frac{1}{3} \Rightarrow b = \frac{1}{3}$

$\frac{a}{b} = \frac{\frac{2}{3}}{\frac{1}{3}} = 2$

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$\frac{|x+m+1|\cancel{|x-1|}}{m|x-1||x+1| + \cancel{|x-1|}} = \frac{|x+m+1|}{m|x+1|+1} = \frac{m}{m+2} \xrightarrow{x=1} \frac{m+2}{2m+1} = \frac{m}{m+2}$

$\Rightarrow 2m^2+m = (m+2)^2 \Rightarrow m^2-3m-4=0 \Rightarrow m = 4, -1$ غ ق ق

$\lim_{x \to \frac{1}{4}} f(x) = \frac{|x+m+1|}{m|x+1|+1} = \frac{|\frac{1}{4}+5|}{4|\frac{5}{4}|+1} = \frac{21}{24}$

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$\sqrt{3}|a^2+a| = 0 \Rightarrow a^2+a=0 \Rightarrow a = 0, -1$

غ ق ق

$(-1)^3 + m - 2 + 1 = 0 \Rightarrow m = 2 \qquad \lim_{x \to -1} f(x) = \frac{\sqrt{3}|-x-1|}{|x+1|^3} \overset{\frac{0}{0}}{=} \frac{\cancel{|x+1|}}{\cancel{|x+1|}|x^2-x+1|} = \frac{1}{3}$

۱۰

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

$a = -\frac{1}{2}$ غ ق ق

 $\lim_{x \to \frac{1}{2}} f(x) = \frac{x^2+|x|}{x^2+2|x|} = \frac{\frac{3}{4}}{\frac{5}{4}} = \frac{3}{5}$