۱)

$6x^2+(m+3)x+\frac{m}{2} \xrightarrow{\Delta=0} m^2+9+6m-12m=0 \quad m=3$

$2a^3+a^2=0 \to a=-\frac{1}{2} \qquad \lim_{x\to -\frac{1}{2}} \frac{\sqrt{6}\,|x+\frac{1}{2}|}{|2x^3+\frac{1}{4}|}=2\sqrt{2}\tan b$

$\frac{\sqrt{6}}{6/4}=2\sqrt{2}\tan b \to \tan b=\frac{\sqrt{3}}{3} \to b=\frac{\pi}{6}$

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۲)

$f(x)=\frac{x^2+ax+b}{x-1} \qquad x^2+ax+b=0 \xrightarrow{x=1} 1+a+b=0 \to a+b=-1$

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

$\Rightarrow 2a=4,\quad a=2,\ b=-3$

$\left[\frac{b-2a}{3}\right]=\left[\frac{-3-4}{3}\right]=\left[-\frac{7}{3}\right]=-3$

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۳)

$x=1$ پیوسته است

$x=1 \to \tan\frac{3\pi}{4}=\lim_{x\to 1^+}\frac{|x^2+x-2|}{a(1-x)}=\lim_{x\to 1^+}\frac{(x+2)(x-1)}{a(1-x)} \to -1=\frac{3}{-a} \to a=3$

$x^2+x-2 \to (x+2)(x-1)$

$x=5 \to b(5-[-5])=\lim_{x\to 5^-}\frac{|x^2+x-2|}{a(1-x)} \to 10b=\frac{28}{3(-4)} \to b=-\frac{7}{30}$

-12

$a\times b=3\times -\frac{7}{30}=-\frac{7}{10}=-0{,}7$

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۴)

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

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

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۵) براکتی : ناپیوسته

$f(a)=-2a$

$f(b)=-2a \to b=0 \qquad \frac{a}{f(b)}=\frac{a}{f(b)}=\frac{a}{-2a}=-\frac{1}{2}$

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۶)

$\lim_{x\to a} f(x)=f(a)=2 \to \lim_{x\to a}\frac{x^2+mx+n}{a-x}=\lim\frac{(x-a)(x-2a)}{-(x-a)}$ | $x^2+mx+n=0 \to (x-2a)(x-a)=0$

$a=2$

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

۷-

$$\left.\begin{array}{l} 0 = a_0 - 1 \\ 0 = b\sin(\frac{\pi}{a}) \\ a^2 = 1 - 4a^2 \end{array}\right\} \quad a_0 = 1,\ 1 - 4a^2 \to 5a^2 + a - 2 = 0 \to \begin{cases} a_0 = -1 \ \text{غ ق ق} \\ a_0 = \frac{2}{5} \end{cases}$$

$$a = \frac{\pi}{2} \to -\frac{1}{5} = b\sin(\frac{5\pi}{2}) \to b = -\frac{1}{5} \qquad \frac{a}{b} = \frac{\frac{2}{5}}{\frac{1}{5}} = 2$$

۸-

$$q = 1^+ \qquad \frac{|q^2 + mq - m - 1|}{m|(q-1)||(q+1)| + |(q-1)|} = \frac{|(q+m+1)|}{m|(q+1)| + 1} = \frac{2+m}{2m+1} = \frac{m}{m+2}$$

$$m^2 + 4 + 4m = 2m^2 + m \to m^2 - 3m - 4 = 0 \to \begin{cases} m = -1 \ \text{غ ق ق} \\ m = 4 \end{cases}$$

$$\lim_{q \to \frac{1}{4}} \frac{|q^2 + 4q - 5|}{4|q^2 - 1| + |q - 1|} = \frac{\frac{35}{16}}{\frac{15}{4} + \frac{3}{4}} = \frac{7}{8}$$

۹-

$$a^2 + a = 0 \to \begin{cases} a = -1 \\ a = 0 \ \text{غ ق ق} \end{cases} \qquad -1 + 2 - m + 1 = 0 \to m = 2$$

-1 غیر صفر

$$\lim_{q \to -1} \frac{\sqrt{3}|-q-1|}{|q^3+1|} = \frac{\sqrt{3}|q+1|}{|q+1|(q^2-1+q)} = \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$$

۱۰-

$$\lim_{q \to 0} f(q) = \frac{|q|(|q|+1)}{|q|(|q|+a)} = \frac{2a-1}{2a+2} \to \frac{1}{a} = \frac{2a-1}{2a+2} \to 2a + 2 = 2a^2 - a$$

$$2a^2 - 3a - 2 = 0 \to \begin{cases} a = 2 \\ a = -\frac{1}{2} \ \text{غ ق ق} \end{cases}$$

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