تمرین‌ها

Subject. Date. / /

(1)

$$f(x)=2\left[\frac{2-x}{2}\right]+a\left[\frac{x+2}{3}\right] \xrightarrow{*} \lim_{x\to -2} 2\left[\frac{2-x}{2}\right]+a\left[\frac{x+2}{3}\right]=2$$

$$\lim_{x\to -2^+} 2\left[\frac{2-x}{2}\right]+a\left[\frac{x+2}{3}\right]=2\left[\frac{4^-}{2}\right]+a\left[\frac{0^+}{3}\right]=2+a\times 0=2 \quad *$$

$$\lim_{x\to -2^-}\left[\frac{2-x}{2}\right]2+a\left[\frac{x+2}{3}\right]=2\left[\frac{4^+}{2}\right]+a\left[\frac{0^-}{3}\right]=4+(-a)=2\to a=2$$

$$\left[\frac{a}{3}\right]\to\left[\frac{2}{3}\right]=0$$

(2)

$$\lim_{x\to \frac{\pi}{6}^-}[2\sin x-1]=\left[2\times\frac{1}{2}^- -1\right]=[1^- -1]=[0^-]=-1$$

(3)

$$\lim_{x\to -\frac{1}{2}}[8x^3-x]\to[x(8x^2-1)]\xrightarrow{x=-\frac{1}{2}}\left[-\frac{1}{2}\left(\cancel{8\times\frac{1}{4}}^{\,2-1=1}-1\right)\right]=\left[-\frac{1}{2}\right]=-1$$

(4)

$$\lim_{x\to -\frac{1}{2}^-}\frac{10x-5+\left[\frac{3}{x^2}\right]}{-16x-\left[\frac{-2}{x^2}\right]}=\frac{-10x-5+\left[\frac{3}{\frac{1}{4}^+}\right]}{-16x-\left[\frac{-2}{\frac{1}{4}^+}\right]}=\frac{-10x-5+[12^-]}{16x-[-8^+]}$$

$$=\frac{-10x-5+11}{16x+8}=\frac{-10x+6}{16x+8}=\frac{+5+6}{-8^-+8}=\frac{11}{0^-}=-\infty$$

(5)

$$\lim_{x\to 1^+}\frac{\sin^2\pi x}{[x]+\cos\pi x}=\frac{\sin^2\pi x}{1+\cos\pi x}=\frac{(1+\cos\pi x)(1-\cos\pi x)}{1+\cos\pi x}=1-\cos\pi x\Rightarrow$$

$$1-\cos\pi=1-(-1)=2$$

PARAMOUNT

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$$\lim_{x \to -۱} \frac{\sqrt{۲x+۳} - \sqrt{۳x+۴}}{۱+\sqrt[۳]{x}} = \frac{۲x+۳-۳x-۴}{۱+x} \times \frac{\left(۱+(\sqrt[۳]{x})^{۲} - \sqrt[۳]{x}\right)}{\sqrt{۲x+۳}+\sqrt{۳x+۴}} =$$ ۴

$$\frac{-x-۱}{x+۱} \times \frac{\left(۱+(\sqrt[۳]{x})^{۲} - \sqrt[۳]{x}\right)}{\sqrt{۲x+۳}+\sqrt{۳x+۴}} = -۱ \times \frac{۱+۱+۱}{۱+۱} = \frac{-۳}{۲}$$

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$$\lim_{x\to 1}\frac{2x-7\sqrt{x}+5}{2x-3\sqrt{x}+1}\to\lim_{x\to 1}\frac{(\sqrt{x}-1)(2\sqrt{x}-5)}{2x-3\sqrt{x}+1}\times\frac{\text{مز}}{\text{مز}}=\lim_{x\to 1}\frac{4(\sqrt{x}-1)(2\sqrt{x}-5)}{4x^2-3x-3}=$$

$$\lim_{x\to 1}\frac{(\sqrt{x}-1)(2\sqrt{x}-5)\times 4}{(x-1)(4x+1)}\times\frac{\sqrt{x}+1}{\sqrt{x}+1}=\lim_{x\to 1}\frac{(x-1)(2\sqrt{x}-5)\times 4}{(x-1)(4x+1)\times 2}=\frac{-6}{5}$$

۸

$$\lim \frac{a+\sqrt{bx+c}}{x} = \frac{a^2-bx-c}{x(a-\sqrt{bx+c})} \Rightarrow a^2=c$$

$$\frac{-bx}{x(a-\sqrt{bx+a^2})} = \frac{-b}{a-|a|} \Rightarrow \frac{-b}{2a} = \frac{1}{4} \rightarrow \frac{b}{a} = -\frac{1}{2} \rightarrow 2b=-a$$

$\rightarrow a<0$ منفی

$$\frac{ab}{c} \Rightarrow \frac{a\times\frac{-a}{2}}{a^2} = \frac{-a^2}{2a^2} = -\frac{1}{2}$$

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$$\lim_{x\to -2\pi} \frac{4+k\left[\frac{x}{\pi}\right]}{\sin x} = +\infty \longrightarrow \lim_{x\to -2\pi^+} \frac{4+k\left[\frac{-2\pi^+}{\pi}\right]}{\sin -2\pi} = \frac{4-2k}{0^+} = +\infty$$

$$4-2k>0 \to k<2 \quad (1)$$

$$\lim_{x\to -2\pi^-} \frac{4+k\left[\frac{-2\pi^-}{\pi}\right]}{\sin -2\pi} = \frac{4-3k}{0^-} = +\infty$$

$$\hookrightarrow 4-3k<0 \to k>\frac{4}{3} \quad (2)$$

$$(1),(2) \Rightarrow \frac{4}{3}<k<2 \longrightarrow -2<-k<-\frac{4}{3} \longrightarrow [-k]=-2$$

۱۵

$$\lim_{x \to ۸} \frac{b\sqrt{۲+\sqrt[۳]{x}}-۲b}{ax-b} = \frac{b^{۲}(۲+\sqrt[۳]{x})-۴b^{۲}}{ax-b(b\sqrt{۲+\sqrt[۳]{x}}+۲b)} = \frac{b^{۲}(-۲+\sqrt[۳]{x})}{(ax-b)(b)(\sqrt{۲+\sqrt[۳]{x}}+۲)} =$$

$$\frac{b^{۲}\cancel{(x-۸)}}{\cancel{(ax-b)}(b)(\sqrt{۲+\sqrt[۳]{x}}+۲)((\sqrt[۳]{x})^{۲}+۴+۲\sqrt[۳]{x})} = \frac{۶۴}{۸(۴)(۱۲)} = \frac{۱}{۶}$$

$a=۱,\ b=۸$