نیایش شاه نظری   تکلیف کد ۳۰   یازدهم تجربی

①

$$\lim_{x\to 1}\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{0\ \text{صفر}}{0\ \text{صفر}}\longrightarrow \frac{\cancel{(x-1)}(4x-3)}{\cancel{(x-1)}(5x-3)}=\frac{4x-3}{5x-3}$$

$$\lim_{x\to 1}\frac{4x-3}{5x-3}=\frac{1}{2}$$

② $\lim\limits_{x\to 0}\dfrac{|3x-1|-|3x+1|}{x}=\lim\limits_{x\to 0}\dfrac{1-3x-(3x+1)}{x}=\lim\limits_{x\to 0}\dfrac{-6\cancel{x}}{\cancel{x}}=\boxed{-6}$

③ $\lim\limits_{x\to 4}\dfrac{x-4}{\sqrt{x}-2}=\lim\limits_{x\to 4}\dfrac{\cancel{(\sqrt{x}-2)}(\sqrt{x}+2)}{\cancel{\sqrt{x}-2}}=\lim\limits_{x\to 4}\sqrt{x}+2=\boxed{4}$

④ $\lim\limits_{x\to 2}\dfrac{x-\sqrt{2x}}{2x^2-x-6}\times\dfrac{x+\sqrt{2x}}{x+\sqrt{2x}}=\lim\limits_{x\to 2}\dfrac{x^2-2x}{2x^2-x-6\,(x+\sqrt{2x})}=$

$\lim\limits_{x\to 2}\dfrac{x\cancel{(x-2)}}{\cancel{(x-2)}(2x+3)(x+\sqrt{2x})}=\lim\limits_{x\to 2}\dfrac{x}{(2x+3)(x+\sqrt{2x})}=\dfrac{2}{7\times 4}=\boxed{\dfrac{1}{14}}$

⑤ $\lim\limits_{x\to 1}\dfrac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\dfrac{1+\sqrt{x}}{1+\sqrt{x}}\times\dfrac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\lim\limits_{x\to 1}\dfrac{\overset{-1}{\cancel{(1-x)}}(2+\sqrt{5-x})}{\cancel{(x-1)}(\sqrt{x}+1)}$

$\lim\limits_{x\to 1}\dfrac{-1(2+\sqrt{5-x})}{\sqrt{x}+1}=\dfrac{-4}{2}=\boxed{-2}$

⑥ $\lim\limits_{x\to 4}\dfrac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\dfrac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\dfrac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}=$

$\lim\limits_{x\to 4}\dfrac{(3x-12)(9+3\sqrt[3]{5x+7}+\sqrt[3]{(5x+7)^2})}{(5x-20)(\sqrt{3x+4}+4)}=\dfrac{27\times 3\cancel{(x-4)}}{8\times 5\cancel{(x-4)}}=\boxed{\dfrac{81}{40}}$

⑦ $\lim\limits_{x\to 1}\dfrac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\dfrac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}\times\dfrac{1+\sqrt[3]{x}+\sqrt[3]{x^2}}{1+\sqrt[3]{x}+\sqrt[3]{x^2}}=$

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$$\lim_{x\to 1}\frac{(۳x+\sqrt{x}-۴)(1+\sqrt[۳]{x}+\sqrt[۳]{x^۲})}{(x-1)(\sqrt{۳x+\sqrt{x}}+۲)}=\boxed{\frac{۳}{۴}}$$

$$\lim_{x\to\pi}\frac{1+\cos^۳x}{\sin^۲x}=\frac{\cancel{(\cos x+1)}(\cos^۲x+1-\cos x)}{\cancel{(\cos x+1)}(\cos x-1)}=$$ ⑧

$$\lim_{x\to\pi}\frac{\cos^۲x-\cos x+1}{\cos x-1}=\frac{۳}{-۲}=\boxed{-۱٫۵}$$

$$\lim_{x\to\frac{\pi}{۴}}\frac{1-\tan x}{\sin x-\cos x}=\frac{\frac{\cos x}{\cos x}-\frac{\sin x}{\cos x}}{-(\cos x-\sin x)}=\frac{\cancel{\cos x-\sin x}}{-\cos x\cancel{(\cos x-\sin x)}}$$ ⑨

$$\lim_{x\to\frac{\pi}{۴}}\frac{-1}{\cos x}=\frac{-1}{\frac{\sqrt{۲}}{۲}}=\frac{-۲}{\sqrt{۲}}=\boxed{-\sqrt{۲}}$$

$$\lim_{x\to\frac{۳\pi}{۴}}\frac{\tan^۲x-1}{\cos ۲x}=\frac{(\tan x+1)(\tan x-1)}{\cos^۲x-\sin^۲x}=\frac{\cancel{\frac{\sin x+\cos x}{\cos x}}\times\overset{-1}{\cancel{\frac{\sin x-\cos x}{\cos x}}}}{\cancel{(\cos x+\sin x)}\cancel{(\cos x-\sin x)}}$$ ⑩

$$\lim_{x\to\frac{۳\pi}{۴}}\frac{-1}{\cos^۲x}=\frac{-1}{\left(-\frac{\sqrt{۲}}{۲}\right)^۲}=\frac{-1}{\frac{1}{۲}}=\boxed{-۲}$$
