۲۰

تکلیف شماره ۳ نگار موسوی یازدهم تجربی A

① $$\lim_{x\to 1} \frac{4x^2-7x+3}{5x^2-8x+3} = \frac{4(x-1)(x-\frac{3}{4})}{5(x-1)(x-\frac{3}{5})} = \lim_{x\to 1} \frac{4x-3}{5x-3} = \boxed{\frac{1}{2}}$$

② $$\lim_{x\to 0} \frac{|4x-1|-|3x+1|}{x} = -7$$

$$\lim_{x\to 0^+} \frac{|4x-1|-|3x+1|}{x} = \frac{-4x+1-3x-1}{x} = \frac{-7x}{x} = -7$$

$$\lim_{x\to 0^-} \frac{|4x-1|-|3x+1|}{x} = \frac{-4x+1-3x-1}{x} = \frac{-7x}{x} = -7$$

③ $$\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = \frac{(\sqrt{x}+2)(\sqrt{x}-2)}{\sqrt{x}-2} = (\sqrt{x}+2) = \boxed{4}$$

④ $$\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} = \frac{x-\sqrt{2x}}{(x-2)(2x+3)} \times \frac{x+\sqrt{2x}}{x+\sqrt{2x}}$$

$$= \frac{x^2-2x}{(x-2)(2x+3)(x+\sqrt{2x})} = \frac{x(x-2)}{(x-2)(2x+3)(x+\sqrt{2x})} = \frac{2}{7\times 4} = \boxed{\frac{1}{14}}$$

⑤ $\lim\limits_{x\to 1} \dfrac{1-\sqrt{x}}{2-\sqrt{5-x}} = \times \dfrac{1+\sqrt{x}}{1+\sqrt{x}} \times \dfrac{2+\sqrt{5-x}}{2+\sqrt{5-x}}$ ✓

$= \dfrac{1-x}{\underbrace{4-5+x}_{x-1}} \times \dfrac{2+\sqrt{5-x}}{1+\sqrt{x}} = -1 \times \dfrac{4}{2} = -2$

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

$= \dfrac{3x+4-16}{5x+7-27} \times \dfrac{27}{8} = \dfrac{\overset{3(x-4)}{3x-12}}{\underset{5(x-4)}{5x-20}} \times \dfrac{27}{8} = \dfrac{3}{5} \times \dfrac{27}{8}$ ✓

$= \dfrac{81}{40}$

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

$= \dfrac{3x+\sqrt{x}-4}{x-1} \times \dfrac{3}{4} \overset{hop}{=} \dfrac{3+\frac{1}{2\sqrt{x}}}{1} \times \dfrac{3}{4} = \dfrac{7}{2} \times \dfrac{3}{4}$

$= \dfrac{21}{8}$

⑧ $\lim\limits_{x\to \pi} \dfrac{1+\cos^3 x}{\sin^2 x} = \dfrac{0}{0} = \dfrac{(1+\cos x)(1-\cos x+\cos^2 x)}{1-\cos^2 x} =$

$\dfrac{(1+\cos x)(1-\cos x+\cos^2 x)}{(1+\cos x)(1-\cos x)} = \dfrac{1+1+1}{2} = \dfrac{3}{2}$ ✓

موضوع: تاريخ: / /

(9) $\lim_{x \to \frac{\pi}{4}} \frac{1-\tan x}{\sin x - \cos x} = \frac{1-\frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{\cos x - \sin x}{\cos x}}{\sin x - \cos x}$ (5)

$\frac{\cos x - \sin x}{(\cos x)(\sin x - \cos x)} = \frac{-1}{\cos x} = \frac{-1 \times 2}{\sqrt{2}} = \frac{-2}{\sqrt{2}} = -\sqrt{2}$

(10) $\lim_{x \to \frac{3\pi}{4}} \frac{\tan^2 x - 1}{\cos^2 x} = \frac{(\tan x - 1)(\tan x + 1)}{\cos^2 x - \sin^2 x} = \frac{\frac{\sin x - \cos x}{\cos x} \times \frac{\sin x + \cos x}{\cos x}}{(\cos x + \sin x)(\cos x - \sin x)}$ (5)

$\frac{(\sin x - \cos x)(\sin x + \cos x)}{\cos^2 x \times (\cos x + \sin x)(\cos x - \sin x)} = \frac{-1}{\cos^2 x} = \frac{-1}{\frac{2}{4}} = \frac{-4}{2} = -2$