Subject :
Year. Month. Date. ( )

۹۸/۱۹

حل دیفرانسیل در درس

(۱) $\lim_{x\to 1} \frac{2x^2-7x+5}{5x^2-11x+6} = \frac{(x-1)(2x-5)}{(x-1)(5x-6)} = \frac{2x-5}{5x-6} = \frac{2-5}{5-6} = \frac{-3}{-1} = 3$

(۲) $\lim_{x\to 0} \frac{|2x-1|-|2x+1|}{x} = \frac{0}{0} \to \frac{1-2x-1-2x}{x} = \frac{-4x}{x} = -4$

(۳) $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0} \to \frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} = \sqrt{x}+2 = 4$

(۴) $\lim_{x\to 2} \frac{x-\sqrt{3x-2}}{x^2-x-2} = \frac{0}{0} = \frac{\sqrt{x}(\sqrt{x}-\sqrt{2})}{(x-2)(x+1)} = \frac{\sqrt{x}(\sqrt{x}-\sqrt{2})}{(x-2)(\sqrt{x}+\sqrt{2})(x+1)} = \frac{\sqrt{2}}{3\times\sqrt{2}\times 2} = \frac{1}{3}$

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

$3x-2 \to 3x-2$

$\frac{1}{3}$

(۵) $\lim_{x\to 1} \frac{1-\sqrt{3x}}{2-\sqrt{5-x}} = \frac{0}{0} \to \frac{1-\sqrt{3x}}{2-\sqrt{5-x}} \times \frac{2+\sqrt{5-x}}{1+\sqrt{3x}} \times \frac{1-3x}{1-x} = -2 \times \frac{3}{2} = -3$

-2

(۶) $\lim_{x\to 3} \frac{\sqrt{x^2+3x}-3}{\sqrt[3]{5x+7}-2} = \frac{0}{0} \to \frac{\sqrt{x^2+3x}-3}{\sqrt[3]{5x+7}-2} \times \frac{\sqrt{x^2+3x}+3}{\sqrt{x^2+3x}+3} \times \frac{\sqrt[3]{(5x+7)^2}+2\sqrt[3]{5x+7}+4}{\sqrt[3]{(5x+7)^2}+2\sqrt[3]{5x+7}+4} =$

$\frac{x^2-9}{5x-15} \times \frac{\sqrt[3]{(5x+7)^2}+2\sqrt[3]{5x+7}+4}{1} \Rightarrow \frac{(x-3)(x+3)}{5(x-3)} \times \frac{12}{1} = \frac{36}{5}$

(۷) $\lim_{x\to 1} \frac{\sqrt{x^2+\sqrt{3x}}-2}{\sqrt[3]{x}-1} \times \frac{x^2}{x^2} \times \frac{6}{6} = \frac{x+\sqrt{3x}-2}{x-1} \times \frac{3}{2} = \frac{3x-3}{2x+\sqrt{3x}-2} \overset{\text{H}}{=} \frac{3}{4x+\frac{3}{2\sqrt{3x}}} = \frac{3}{4+\frac{3}{2\sqrt{3}}} = \frac{3}{\frac{11}{2}} = \frac{6}{11}$

$\frac{3}{4+3\times\frac{1}{2\sqrt{3}}} = \frac{3}{4+\frac{3}{2\sqrt{3}}} = \frac{3}{\frac{11}{2}} = \frac{6}{11}$

(۸) $\lim_{x\to 3} \frac{\sqrt{x^2+3x}-3}{\sqrt[3]{5x+7}-2} = \frac{0}{0} \to \frac{\sqrt{x^2+3x}-3}{\sqrt[3]{5x+7}-2} \times \frac{\sqrt{x^2+3x}+3}{\sqrt{x^2+3x}+3} \times \frac{\sqrt[3]{(5x+7)^2}+2\sqrt[3]{5x+7}+4}{\sqrt[3]{(5x+7)^2}+2\sqrt[3]{5x+7}+4} =$

$\frac{x^2-9}{5x-15} \times \frac{12}{8} \Rightarrow \frac{(x-3)(x+3)}{5(x-3)} \times \frac{12}{8} = \frac{36}{40} = \frac{9}{10}$

PAPCO

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$$\lim_{x \to \pi} \frac{1+\cos^3 x}{\sin^2 x} = \frac{(1+\cos x)(1+\cos^2 x - \cos x)}{1-\cos^2 x} = \frac{(1+\cos x)(1+\cos^2 x - \cos x)}{(1-\cos x)(1+\cos x)} = \frac{1+\cos^2 x - \cos x}{1-\cos x}$$ (۸)

$$\to \frac{1+1+1}{2} = \frac{3}{2}$$

$$\lim_{x \to \frac{\pi}{2}} \frac{1-\tan x}{\sin x - \cos x} = \frac{\frac{\cos x}{\cos x} - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{+1}{\cos x - \sin x}}{\cos x} = \frac{-1}{\cos x} = \frac{-1}{\frac{\sqrt{2}}{2}} = -\sqrt{2}$$ (۹)

$$= -\sqrt{2}$$

$$\lim_{x \to \frac{\pi}{2}} \frac{\tan^2 x - 1}{\cos^2 x} = \frac{\frac{\sin^2 x}{\cos^2 x} - \frac{\cos^2 x}{\cos^2 x}}{\cos^2 x - \sin^2 x} = \frac{\frac{\sin^2 x - \cos^2 x}{\cos^2 x}}{\cos^2 x - \sin^2 x} = \frac{-1}{\cos^2 x} =$$ (۱۰)

$$\frac{-1}{\left(-\frac{\sqrt{2}}{2}\right)^2} = -2$$