Subject :
Year. Month. Date. ( )

حل دیاتی در درسی

(۱) $\lim_{x\to 1} \frac{۲x^۲-۷x+۳}{۵x^۲-۱۰x+۵} = \frac{(x-۱)(۲x-۳)}{(x-۱)(۵x-۵)} = \frac{۲x-۳}{۵x-۵} = \frac{۲-۳}{۵-۵} = \frac{-۱}{۰} = \boxed{\frac{۱}{۲}}$

(۲) $\lim_{x\to ۰} \frac{|۳x-۱|-|۳x+۱|}{x} = \frac{۰}{۰} \to \frac{۱-۳x-۳x-۱}{x} = \frac{-۶x}{x} = \boxed{-۶}$

(۳)

(۴) $\lim_{x\to ۳} \frac{x-۳}{\sqrt{x}-۲} = \frac{۰}{۰} \to \frac{(\sqrt{x}-۲)(\sqrt{x}+۲)}{\sqrt{x}-۲} = \sqrt{x}+۲ = ۳+۲ = ۵$

(۵) $\lim_{x\to ۲} \frac{x-\sqrt{۲x}}{x^۲-x-۶} = \frac{۰}{۰} = \frac{\sqrt{x}(\sqrt{x}-\sqrt{۲})}{(x+۲)(x-۳)(\sqrt{x}+\sqrt{۲})} = \frac{\sqrt{x}}{(x+۲)(\sqrt{x}+\sqrt{۲})} = \frac{\sqrt{۲}}{۴\times ۲\sqrt{۲}} = \boxed{\frac{۱}{۸}}$

$x^۲-x-۱۲ = (x+۳)(x-۴)$

$\frac{۲}{۵}-۳x$

$\frac{۱}{۱۶}$

(۶) $\lim_{x\to ۱} \frac{۱-\sqrt{x}}{۲-\sqrt{۵-x}} = \frac{۰}{۰} \to \frac{۱-\sqrt{x}}{۲-\sqrt{۵-x}} \times \frac{۱+\sqrt{x}}{۱+\sqrt{x}} \times \frac{۲+\sqrt{۵-x}}{۲+\sqrt{۵-x}} = \frac{۱-x}{۴-(۵-x)} \times \frac{۲+\sqrt{۵-x}}{۱+\sqrt{x}} = \frac{-(x-۱)}{x-۱} \times \frac{۴}{۲} = \boxed{-۲}$

(۷)

(۸) $\lim_{x\to ۳} \frac{\sqrt{۲x+۳}-۳}{\sqrt[۳]{۵x+۷}-۲} = \frac{۰}{۰} \to \frac{\sqrt{۲x+۳}-۳}{\sqrt[۳]{۵x+۷}-۲} \times \frac{\sqrt{۲x+۳}+۳}{\sqrt{۲x+۳}+۳} \times \frac{\sqrt[۳]{(۵x+۷)^۲}+۲\sqrt[۳]{۵x+۷}+۴}{\sqrt[۳]{(۵x+۷)^۲}+۲\sqrt[۳]{۵x+۷}+۴} = \frac{۲x-۶}{۵x-۱۵} \times \frac{۱۲}{۱} \Rightarrow \frac{۲(x-۳)}{۵(x-۳)} \times \frac{۱۲}{۱} = \boxed{\frac{۲۴}{۵}}$

(۹) $\lim_{x\to ۱} \frac{\sqrt{۳x+\sqrt{x}}-۲}{\sqrt[۳]{x}-۱} \times \frac{x^{\frac{۱}{۲}}+۲}{x^{\frac{۱}{۲}}+۲} \times \frac{x^{\frac{۲}{۳}}+x^{\frac{۱}{۳}}+۱}{x^{\frac{۲}{۳}}+x^{\frac{۱}{۳}}+۱} = \frac{۳x-۴}{x-۱} \times \frac{۳}{۴} \times \frac{۳}{۴} \overset{\text{Hop}}{=} \frac{۹x+۲\sqrt{x}-۱۲}{۳x^۲} = \frac{۹+۱-۱۲}{۳} = \frac{-۲}{۳}$

$\frac{۹+۲\times\frac{۱}{۲}x^{-\frac{۱}{۲}}}{۳} = \frac{۳}{۴} = \boxed{\frac{۷}{۱۲}}$

PAPCO

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

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

(۹) $\lim_{x \to \frac{\pi}{4}} \frac{1-\tan x}{\sin x - \cos x} = \frac{\frac{\cos x}{\cos x} - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{+1}{\cos x - \sin x}}{\cos x} = \frac{-1}{\cos x} = \frac{-1}{\frac{\sqrt{2}}{2}} = \boxed{-\sqrt{2}}$

$\boxed{-\sqrt{2}}$

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

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