北京大学

高数大练习 1.　　§3.1　换元积分法.

一. 求积分:

$\int \cos\frac{1}{2}x\,dx$　　$\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx$

$\int (2x+1)^7\,dx$　　$\int e^{2x-1}\,dx$

$\int \frac{1}{1-3x}\,dx$　　$\int \frac{x^2}{1+x^3}\,dx$

$\int \frac{\sqrt{1+\ln x}}{x}\,dx$　　$\int \frac{1}{x(1+\ln x)}\,dx$

$\int e^{\sin x}\cos x\,dx$　　$\int x^2 e^{x^3}\,dx$

$\int x\sqrt{1-x^2}\,dx$　　$\int \frac{x\,dx}{3+2x^2}$

$\int \frac{\sin(\sqrt{x}+2)}{\sqrt{x}}\,dx$　　$\int \frac{\arctan x}{1+x^2}\,dx$

$\int \frac{1}{4+x^2}\,dx$　　$\int \frac{1}{x^2-4}\,dx$

$\int \frac{1}{x^3}\sin\frac{1}{x}\,dx$.　　$\int \frac{2x-3}{x^2-3x+4}\,dx$.

二. 求积分:

$\int 2\cos 2x\,dx$　　$\int x\sin x^2\,dx$

$\int \frac{dx}{3+2x}$　　$\int \frac{dx}{x(1+2\ln x)}$.

$\int \frac{x}{1+x^2}\,dx$.　　$\int x^2\sqrt{4-3x^3}\,dx$.

$\int \tan x\,dx$　　$\int \frac{e^x}{1+e^x}\,dx$

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三. 求积分：

$\int \frac{1}{1+\sqrt{2x}}\,dx$

$\int \sqrt{1-x^2}\,dx$

$\int \frac{1}{x\sqrt{4+x^2}}\,dx$.

$\int x\sqrt{x+1}\,dx$.

四. 重温书上例题. 求积分：

$\int \tan x\,dx$.

$\int \sin(ax+b)\,dx$.

$\int \frac{x\,dx}{1+x^4}$.

$\int \sin nx \sin mx\,dx$.

$\int \frac{dx}{a^2+x^2}$.

$\int \frac{dx}{a^2-x^2}$.

$\int \frac{dx}{\sqrt{a^2-x^2}}$.

$\int \frac{dx}{\sin x}$.

$\int \frac{dx}{\cos x}$.

~~$\int \sec x\,dx$~~

~~$\int \csc x\,dx$~~.

$\int \sin^3 x \cos^2 x\,dx$

$\int \frac{dx}{\sqrt{x+1}-1}$.

$\int \sqrt{a^2-x^2}\,dx$

$\int \frac{dx}{\sqrt{x^2+a^2}}$.

$\int \frac{dx}{\sqrt{x^2-a^2}}$.

$\int \frac{2x}{\sqrt{x^2+2x+26}}\,dx$

$\int \frac{\sqrt{4-x^2}}{x}\,dx$.

五. 完成书上习题 3.1.