Integration Methods

some stuff you learned and didn't even realize that you learned it.

inverse trig stuff #21,22,23 pg 515

#2 pg 516

$\int \sqrt{4+9x}\,dx$ let $u = 4+9x$ $\frac{du}{dx} = 9$

$du = 9\,dx$

$\frac{1}{9}\int \sqrt{4+9x}\,9\,dx$

$= \frac{1}{9}\int u^{\frac{1}{2}}\,du = \frac{1}{9}\frac{u^{3/2}}{3/2} = \frac{2}{27}(4+9x)^{3/2} + C$

#4 $\int 4x\tan(x^2)dx$ let $u=x^2$ $du=2xdx$

$$2\int \tan(x^2)2x\,dx = 2\int \tan u\,du =$$

#13

$$= 2\left(-\ln|\cos u| + C\right)$$

$$= -2\ln|\cos(x^2)| + C$$

$y = \ln|\cos(x^2)|$

$y' = \frac{1}{\cos x^2}(-\sin x^2)2x$

$y' = -\frac{\sin(x^2)}{\cos(x^2)}2x = -2x\tan(x^2)$

$\frac{d}{dx}\tan u$

$\sec^2 u \frac{du}{dx}$

#6) $\int \frac{1}{4+9x^2}\,dx$ let $u=3x$ $du=3dx$

$u^2=9x^2$

$=\frac{1}{3}\int \frac{du}{2^2+u^2}=\frac{1}{3}\left(\frac{1}{2}\tan^{-1}\left(\frac{u}{2}\right)\right)+C$

$\frac{1}{6}\tan^{-1}\left(\frac{3x}{2}\right)+C$

14) $\int \frac{e^{\tan^{-1}x}}{1+x^2}\,dx$

let $u = \tan^{-1}x$

$du = \frac{1}{1+x^2}\,dx$

$$\int e^{\tan^{-1}x}\cdot\frac{dx}{1+x^2} = \int e^u\,du = e^u + C$$

$$e^{\tan^{-1}x} + C$$

28) $\int \frac{e^x}{\sqrt{4-e^{2x}}}\,dx$

let $u = e^x$ $du = e^x dx$

$u^2 = (e^x)^2$

$u^2 = e^{2x}$

$= \int \frac{du}{\sqrt{2^2-u^2}}$

$= \sin^{-1}\left(\frac{u}{2}\right)+C = \sin^{-1}\left(\frac{1}{2}e^x\right)+C$

HW:

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