Using Integration Tables...

Here is an example of integration tables

How do these things work???

ex. $\int x^5 e^{7x}\,dx$ (#57) $n=5$, $a=7$

$= \frac{x^5 e^{7x}}{7} - \frac{5}{7}\int x^4 e^{7x}\,dx$

2/ $\int x^2 \cos(7x)\,dx$ $a=7$

$= \frac{2x\cos 7x}{49} + \frac{49x^2-2}{343}\sin(7x) + C$

Warm Up...

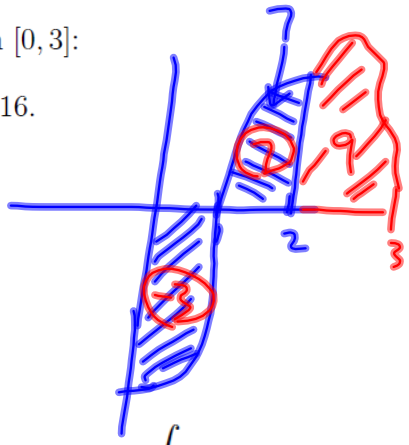
Binghamton University: Calc 2 Final Exam

1. You are told the following about a function f that is defined on $[0, 3]$:

$$\int_0^2 f(x)\,dx = 4, \qquad \int_1^2 f(x)\,dx = 7, \qquad \int_1^3 f(x)\,dx = 16.$$

(i) What is $\int_0^1 f(x)\,dx$? $= -3$

(ii) What is $\int_0^3 f(x)\,dx$? $= 13$



2. Evaluate each of the following integrals:

$$\int (x-1)\sqrt{x^2-2x-3}\,dx \qquad \int \frac{1}{x^3+x}\,dx \qquad \int x\sec x\tan x\,dx$$

3. (20 points) Evaluate $\int \frac{x^3}{\sqrt{1-x^2}}\,dx$

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

$u = x^2-2x-3$

$du = 2x-2\,dx$

$\frac{du}{2} = (x-1)\,dx$

$\frac{1}{2}\int u^{1/2}\,du$

$= \frac{1}{3}u^{3/2}+C$

$= \frac{1}{3}(x^2-2x-3)^{3/2}+C$

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

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

$\frac{A}{x} + \frac{Bx+C}{x^2+1} = \frac{1}{x^3+x}$

$A(x^2+1)+x(Bx+C) = 1$

$Ax^2+Bx^2+Cx+A = 1$

$A+B=0 \quad C=0 \quad A=1$

$\therefore 1+B=0$

$B=-1$

$\int \frac{1}{x}dx - \frac{1}{2}\int \frac{x^{(2)}}{x^2+1}dx$

$= \ln|x| - \frac{1}{2}\ln(x^2+1)+C$

$$\int x \sec x \tan x \, dx$$

$u = x \qquad dv = \sec x \tan x \, dx$

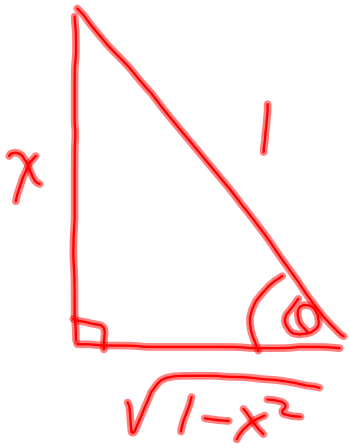
$du = dx \qquad v = \sec x$

$$= x \sec x - \int \frac{\sec x \, dx}{1} \left(\frac{\sec x + \tan x}{\sec x + \tan x} \right)$$

$$- \int \frac{\sec^2 x + \sec x \tan x}{\tan x + \sec x}$$

$$= x \sec x - \ln \left| \tan x + \sec x \right| + C$$

3. (20 points) Evaluate $\int \frac{x^3}{\sqrt{1-x^2}}\,dx$



$\sin\theta = x$

$\cos\theta\, d\theta = dx$

$\cos\theta = \sqrt{1-x^2}$

$$\int \frac{\sin^3\theta \cos\theta\, d\theta}{\cos\theta}$$

$$\int \sin^3\theta\, d\theta$$

$$\int \sin^2\theta \sin\theta\, d\theta$$

$$\int (1-\cos^2\theta)\sin\theta\, d\theta$$

$$\int \sin\theta\, d\theta + \int \cos^2\theta(-)\sin\theta$$

$$= -\cos\theta + \frac{1}{3}\cos^3\theta + C$$

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

Warm Up

Simon Fraser University: Final Exam 2006

1. Evaluate the following, if it is possible: **[4 marks each = 24 marks]**

a) $\int x^2 (\ln x)^2 \, dx$

b) $\int_0^{\frac{\pi}{2}} \cos^3 x \sin 2x \, dx$

c) $\int \frac{3}{x^{-\frac{1}{2}}\left(x^{\frac{3}{2}} - x^{\frac{1}{2}}\right)} dx$

d) $\int \frac{\sqrt{x^2 - 1}}{x} dx$

e) $\int_0^3 \frac{dx}{x^2 - x - 2}$

f) $\frac{d}{dx}\int_e^{\ln x} \sin(t^2 + 1)\, dt$

Attachments

Integration Tables.pdf