AP Calculus AB
Thursday, February 20, 2014

Write the number of any "problem" problems on the board!

12, 28, ~~36~~, ~~38~~, 48-54
26, 34, ~~40~~

$\int \csc^2 x\,dx = -\cot x + C$

(54) $\int \csc^2\left(\frac{x}{2}\right) dx$

$u = \frac{x}{2} = \frac{1}{2}x$

$du = \frac{1}{2}dx$

$2\,du = dx$

$\int (\csc^2 u)\, 2\,du$

$2\int \csc^2 u\,du$

$= -2\cot u + C$

$= -2\cot\left(\frac{x}{2}\right) + C$

(52) $\int \frac{\sin x}{\cos^3 x}\,dx$

$u = \cos x$

$du = -\sin x\,dx$

$-1 \cdot du = \sin x\,dx$

$\int \frac{-1 \cdot du}{u^3}$

$\int -1 \cdot u^{-3}\,du$

$= \frac{-1 \cdot u^{-2}}{-2} + C$

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

$= \frac{1}{2\cos^2 x} + C$

$$\int \frac{\sin(x)}{\cos^3(x)}\,dx = \frac{\sec^2(x)}{2} + \text{constant}$$

$$\int \sqrt{\tan x}\,\sec^2 x\,dx$$

$u = \tan x$

$du = \sec^2 x\,dx$

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

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

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

(48) $$\int \sec(1-x)\tan(1-x)\,dx$$

$u = 1-x$

$du = -1 \cdot dx$

$-1 \cdot du = dx$

$$-1\int \sec u \tan u\,du$$

$$= -1 \cdot \sec u + C$$

$$= -1 \cdot \sec(1-x) + C$$

15) $\int \sin^3 x \cos x\,dx$

$u = \sin x$

$= \frac{\sin^4 x}{4} + C$

13) $\int \cos 4x\,dx$

$u = 4x$

$\frac{1}{4}\sin 4x + C$

11) $\int \frac{x-5}{\sqrt{x-6}}\,dx$

$u = x-6 \rightarrow du = dx$

$+1 \quad +1$

$u+1 = x-5$

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

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

$$= \frac{2}{3}(x-6)^{3/2} + 2(x-6)^{1/2} + C$$