Class Work –6

Name: Sols

Find:

1. $\int x\sin(x)\ dx$ $= -x\cos x + \int \cos x\ dx = -x\cos x + \sin x + C$

$u = x \qquad du = dx$

$dv = \sin x\, dx \qquad v = -\cos x$

2. $\int t^4 \ln(t)\, dt.$ $= \frac{1}{5}t^5\ln(t) - \frac{1}{5}\int t^4\, dt = \frac{1}{5}t^5\ln(t) - \frac{1}{25}t^5 + C$

$u = \ln(t) \quad du = \frac{1}{t}dt$

$dv = t^4\, dt \qquad v = \frac{1}{5}t^5$

3. $\int (sec^2(x) + \sec(x)\tan(x))\ dx.$ $= \int \sec^2 x\, dx + \int \sec x \tan x\, dx$

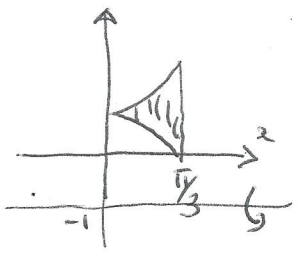
$= \tan x + \sec x + C$

4. $\int x\, sec^2(x) dx$ $= x\cdot\tan(x) - \int \tan x\, dx + C = x\tan x + \ln|\cos x| + C$

$u = x \qquad du = dx$

$dv = \sec^2 x\, dx \qquad v = \tan(x)$

5. Find the volume of the solid obtained by revolving the region bounded by the curves $y = \sec(x)$, $y = \cos(x)$, $0 \le x \le \frac{\pi}{3}$, *about* $y = -1$.



$\pi \int_0^{\pi/3} \left[(\sec x + 1)^2 - (\cos x + 1)^2\right] dx = \pi \int_0^{\pi/3} \left[\sec^2 x + 2\sec x - \cos^2 x - 2\cos x\right] dx$

$= \pi \left[\tan x + 2\ln|\sec x + \tan x| - \frac{1}{2}x - \frac{1}{4}\sin 2x - 2\sin x\right]_0^{\pi/3}$

$= \pi \left[\sqrt{3} + 2\ln\left[2+\sqrt{3}\right] - \frac{\pi}{6} - \frac{\sqrt{3}}{8} - \frac{\sqrt{3}}{2}\right] = \pi\left[2\ln(2+\sqrt{3}) - \frac{\pi}{6} - \frac{\sqrt{3}}{2}\right]$