Problem Set 16
E1: Revision

Please indicate the members who are present. Also indicate the group coordinator.

Group Number:	
Members:	

Problem 1

If $\int_{12}^{0} f(x)dx = -36$ and $\int_{0}^{9} f(x)dx = 20$. Find $\int_{3}^{4} f(3x)dx$

Problem 2

Evaluate $\int_{0}^{1} (x^{10} + 10^{x})dx$.

Problem 3

Find the limit, if exists,

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{2}{n} \left(1 + \frac{31i}{n}\right)^{-4/5}$$

.

Problem 4

Find the average value of $f(x) = \dfrac{x}{(x^2+1)^3}$ from 1 to 3.

Problem 5

The base of a solid S is bounded by $x = y^3, y = 1$ and the y-axis. If parallel cross-sections perpendicular to y-axis are equilateral triangles. Find the volume of the solid.

Problem 6

Using the method of cylindrical shells, find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x}, x = 0$ and $y = 1$ about the line $y = 2$.

Problem 7

Evaluate $\int \frac{dx}{1+\cos x}$
(DO IT IN TWO DIFFERENT METHODS).

Problem 8

Find $\int \tan^3 x \sec^5 x dx$.

Problem 9

Evaluate $\int_0^{\pi/2} \cos(3x)\cos(2x)dx$.

Problem 10

Describe the volume of the solid generated by rotating the region bounded by the curves $y = 4x - x^2$ and $y = x$ about the $y-$axis by TWO DIFFERENT INTEGRALS (do not evaluate).

Problem 11

Evaluate $\int_0^{\pi/2} (2 - \sin\theta)^2 d\theta$.

Problem 12

Find $\int \frac{dx}{\sqrt{x^2+9}}$ (using trigonometric substitution).

Problem 13

Evaluate $\int_0^{\pi} (3x+2)\cos\left(\frac{x}{2}\right) dx$.

Problem 14

Evaluate $\int_{\ln(\pi/4)}^{\ln(\pi/2)} e^x \tan^{-1}(e^x)\, dx$.