

Recitation #9: Integration by parts and Trig Integrals - Instructor Notes

Group work:

Problem 1 Evaluate the following integrals

(a) $\int_1^3 x^2 5^x dx$

(b) $\int \sin(3x)e^{7x} dx$

(c) $\int x^{\frac{5}{3}} (\ln x)^2 dx$

Instructor Notes: All three parts involve standard strategies learned in the online lessons. For each, split the problems between the groups. Then discuss each problem as a class, getting input from the group(s) that worked on that problem.

Problem 2 Evaluate the following integrals

(a) $\int x^5 \cos(x^3) dx$

(b) $\int \cos(\sqrt{x}) dx$

(c) $\int x \cos x \sin x dx$

Instructor Notes: For this problem, you might just lead a whole class discussion - hopefully soliciting ideas from the students (on their own or with hints). You might want to note that some of the problems may be approached in different ways. For example, one could begin part (a) with either the substitution $u = x^3$ or by parts with $u = x^3$, $dv = x^2 \cos(x^3)$.

Problem 3 Evaluate the following integrals

(a) $\int \tan^{23} x \sec^6 x \, dx$

(b) $\int \tan^2 x \sec x \, dx$ *Hint:* $\int \sec x \, dx = \ln |\sec x \tan x| + C$

(c) $\int \tan^2 x \sin x \, dx$

Instructor Notes: All three parts involve standard strategies learned in the online lessons. For each, split the problems between the groups. Then discuss each problem as a class, getting input from the group(s) that worked on that problem.

Problem 4 Evaluate

$$\int_{-\pi}^0 \sqrt{1 - \cos^2 x} \, dx.$$

Instructor Notes: You may want to do this problem as a whole class - perhaps play-acting by claiming that it is equal to $\int_{-\pi}^0 \sin x \, dx$ rather than

$$\int_{-\pi}^0 |\sin x| \, dx$$
