Rutgers University
Math 152

Section 8.2: Integration by Parts - Worksheet

1. Evaluate the following antiderivatives.

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

   (b) $\int x^2 \sin^{-1}(x)dx$

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

   (d) $\int x^3 e^{-x^2}dx$

   (e) $\int e^{-2x} \sin(3x)dx$

   (f) $\int x \sec(5x)^2 dx$

2. Calculate the volume of the solid obtained by revolving the given region about the given axis using (i) the method of disks/washers and (ii) the method of cylindrical shells.

   (a) The region between the graph of $y = \sqrt{\tan^{-1}(x)}$ and the x-axis for $0 \leqslant x \leqslant 1$ revolved about the x-axis.

   (b) The region bounded by the y-axis, the graph of $y = \sin(x)$ and the line $y = 1$ revolved about the y-axis.

   (c) The region between the graph of $y = \ln(x)$ and the x-axis for $1 \leqslant x \leqslant e$ revolved about the line $x = -2$.

3. Find reduction formulas for the following integrals.

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

   (b) $\int \ln(x)^n dx$

   (c) $\int \sec(5x)^n dx$