Section 8.2: Integration by Parts - Worksheet

#33. Evaluate the following integrals. **Note:** some of these problems use integration techniques from earlier sections.

(a) $\displaystyle\int 5xe^{8x+1}dx$

(b) $\displaystyle\int \arctan(7x)dx$

(c) $\displaystyle\int x^3\cos(5x)dx$

(d) $\displaystyle\int x^3\cos(5x^4)dx$

(e) $\displaystyle\int_1^e (\ln(x))^2\, dx$

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

(g) $\displaystyle\int_0^{\pi/12} x\sec(4x)\tan(4x)dx$

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

(i) $\displaystyle\int x^3 e^{-x^2}\,dx$

(j) $\displaystyle\int_3^6 \frac{dx}{\sqrt{12x-x^2}}$

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

(l) $\displaystyle\int_{-2}^{-1} x\sec^{-1}(x)dx$

(m) $\displaystyle\int \theta\sec^2(7\theta)d\theta$

(n) $\displaystyle\int \sin(\sqrt{3x+5})dx$

(o) $\displaystyle\int \frac{x}{\sqrt{5x+1}}dx$

#34. 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 $x = -2$.

#35. Express $\displaystyle\int \sin^7(2x)dx$ in terms of $\displaystyle\int \sin^5(2x)dx$.

#36. Express $\displaystyle\int \sec^9(4x)dx$ in terms of $\displaystyle\int \sec^7(4x)dx$.

#37. Find reduction formulas for the following integrals.

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

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

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