Math 102 — Integration by substitution cont. and integration by parts

Problem 1. Find the following definite integrals using substitution. Identify w, compute $dw = w'(x)\,dx$, and convert the limits of integration to start.

a. $\int_0^2 \sqrt{5x+2}\,dx$

b. $\int_0^1 (8x+2)(2x^2+x)^4\,dx$

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

d. $\int_0^{\pi/2} e^{-\cos\theta}\sin\theta\,d\theta$

e. $\int_1^8 \frac{e^{x^{1/3}}}{x^{2/3}}\,dx$

Problem 2. Find the following indefinite integrals using integration by parts.

a. $\int x\sin x\,dx$

b. $\int xe^{2x}\,dx$

c. $\int x^4\ln x\,dx$

d. $\int x^2\sin x\,dx$

e. $\int \cos^2 x\,dx$