List of suggested exercises, Section 7.4 (plus a small list for review)

For the DGD of May 8th and 10th

(1) Find the following integrals:

$$\int \frac{x^2}{x+1}\,dx \qquad \int \frac{3x^3-x^2+6x-4}{(x^2+1)(x^2+2)}\,dx \qquad \int \frac{4x-1}{x^2+x-2}\,dx$$

$$\int \frac{6x-5}{2x+3}\,dx \qquad \int \frac{x^2-2x-1}{(x-1)^2(x+1)^2}\,dx \qquad \int \frac{x^2+1}{x^2-x}\,dx$$

$$\int \frac{x-3}{(x^2+2x+4)^2}\,dx \qquad \int \frac{1}{(x-1)^2(x+4)}\,dx \qquad \int \frac{\sin(x)\cos^2(x)}{5+\cos^2(x)}\,dx$$

$$\int \frac{x^3}{(x+1)^3}\,dx \qquad \int \frac{x^3}{x^3+1}\,dx \qquad \int \frac{4x^2+5x+7}{4x^2+4x+5}\,dx$$

(2) Find the following integrals:

$$\#46 \int \frac{dz}{(4-z^2)^{3/2}} \qquad \#45 \int \frac{dt}{t^2\sqrt{1+t^2}} \qquad \#43 \int \frac{x^2}{\sqrt{9-x^2}}\,dx$$

(3) Show that the following equation holds:

$$\int_{-1}^{1} \frac{dx}{\sqrt{5+2x+x^2}} = \int_{0}^{\frac{\pi}{4}} \sec(w)dw$$

(4) Exercise #59:

(a) Show that $\int \frac{1}{\sin^2(x)}dx = -\frac{1}{\tan(x)} + C$.

(b) Calculate $\int \frac{dy}{y^2\sqrt{5-y^2}}$

(5) From pp. 361–362:

$$\#23 \int x\sqrt{4-x^2}\,dx \qquad \#25 \int \frac{\cos(\sqrt{y})}{\sqrt{y}}\,dy \qquad \#126 \int \frac{3x+1}{x(x^2-1)}\,dx$$

$$\#12 \int \frac{(1+\ln(x))^2}{x}\,dx \qquad \#132 \int \frac{e^x}{e^{2x}-1}dx \qquad \#16 \int x\sqrt{1-x}\,dx$$

$$\#24 \int \frac{(u+1)^3}{u^2}\,du \qquad \#36 \int \sin(5\theta)\cos(5\theta)d\theta \qquad \#59 \int \frac{x\cos(\sqrt{x^2+1})}{\sqrt{x^2+1}}\,dx$$

$$\#61 \int ue^{ku}\,du \qquad \#65 \int (e^x+x)^2\,dx \qquad \#40 \int \cos^3(2\theta)\sin(2\theta)\,d\theta$$

$$\#42 \int \sin^3(x)\cos^3(z)\,dz \qquad \#50 \int \frac{\cos(w)}{1+\sin^2(w)}\,dw \qquad \#56 \int \frac{\sin(w)}{\sqrt{1-\cos(w)}}\,dw$$

$$\#64 \int r(\ln r)^2\,dr \qquad \#110 \int_0^1 \frac{1}{\sqrt{1+5x^2}}\,dx \qquad \#131 \int \frac{\cos(x)}{\sin^3(x)+\sin(x)}\,dx$$