List of suggested exercises, Section 7.7-8
For the DGD of May 15th and 17th

(1) Using the comparison test, determine if the following integrals converge or diverge:

$$\#3 \int_1^\infty \frac{x^2+1}{x^3+3x+2}dx \qquad \int_0^\pi \frac{2+\sin\phi}{\phi^2} \qquad \#10 \int_{50}^\infty \frac{dz}{z^3}$$

$$\#8 \int_1^\infty \frac{1}{e^{5t}+2}dt \qquad \#18 \int_1^\infty \frac{d\theta}{\sqrt{\theta^2+1}} \qquad \#19 \int_1^\infty \frac{d\theta}{\sqrt{\theta^3+1}}$$

$$\int_0^{\pi/2} \frac{dx}{x\sin x} \qquad \int_0^1 \frac{e^{-x}}{\sqrt{x}}\,dx \qquad \int_1^\infty \frac{\sin^2 x}{x^2}\,dx$$

(2) Determine whether each integral is convergent or divergent. Evaluate those that converge.

$$\int_0^\infty \frac{dt}{(t+2)(t+3)} \qquad \int_1^\infty \frac{\ln x}{x}\,dx \qquad \int_{\pi/4}^{\pi/2} \tan^2 w\,dw$$

$$\int_0^\pi |\sec x|\,dx \qquad \int_0^1 \frac{-\ln x}{\sqrt{x}} \qquad \int_{\pi/4}^{\pi/2} \sec^2 x\,dx$$

$$\int_0^{\pi/4} \frac{\cos x}{\sqrt{\sin x}}\,dx \qquad \int_{-\infty}^\infty e^{-|x|}\,dx \qquad \int_4^5 \frac{dx}{(5-x)^{2/3}}\,dx$$

(3) For what value of p does the following integrals converge or diverge ?

$$\#30 \int_2^\infty \frac{dx}{x(\ln x)^p} \qquad \#31 \int_1^2 \frac{dx}{x(\ln x)^p}$$

(4) Evaluate the following integrals. You might want to split the domain of integration.

$$\int_0^\infty \frac{dx}{\sqrt{x}(1+x)} \qquad \int_2^\infty \frac{dx}{x\sqrt{x^2-4}}$$