HW: page 395 5,13,21,27,31,43,45

5) $\int e^{2x}dx$ $u=2x$ $du=2dx$

$\frac{1}{2}\int e^{2x}\cdot 2dx = \frac{1}{2}e^{2x}+C$ $\int e^u du = e^u + C$

13) $\int t\sqrt{7t^2+12}\,dt$ let $u=7t^2+12$

$du=14t\,dt$

$\frac{1}{14}\int \sqrt{7t^2+12}\,(14t\,dt)$

$\frac{1}{14}\int u^{1/2}du = \frac{1}{14}\cdot\frac{2}{3}u^{3/2}+C = \frac{1}{21}(7t^2+12)^{3/2}+C$

21) $\int x^2 e^{-2x^3}\,dx$

let $u = -2x^3$

$du = -6x^2\,dx$

$\int e^u\,du = e^u + C$

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

$-\frac{1}{6}e^{-2x^3} + C$

$\frac{d\left(-\frac{1}{6}e^{-2x^3}\right)}{dx} = -\frac{1}{6}e^{-2x^3}(-6x^2)$

$= x^2 e^{-2x^3}$

27) $\int \frac{dx}{e^x} = \int e^{-x}\,dx$ let $u = -x$, $du = -dx$

$= -\int e^{-x}(-dx)$

$= -e^{-x} + C$

31) $\int \cos 4\theta \sqrt{2-\sin 4\theta}\, d\theta$

let $u = 2-\sin 4\theta$

$\frac{du}{d\theta} = -\cos 4\theta \cdot 4$

$du = -4\cos 4\theta\, d\theta$

$-\frac{1}{4}\int (2-\sin 4\theta)^{\frac{1}{2}}(-4\cos 4\theta\, d\theta)$

$-\frac{1}{4}\cdot\frac{2}{3}(2-\sin 4\theta)^{3/2}+C$

$-\frac{1}{6}(2-\sin 4\theta)^{3/2}+C$

43) $\int \tan^2 3\theta \, d\theta$

$\int (\sec^2 3\theta - 1) \, d\theta$

$\int \sec^2 3\theta \, d\theta - \int d\theta$

$\left(\frac{1}{3} \int \sec^2 3\theta (3 d\theta) \right] - \theta$

let $v = \sec^2 3\theta$

$dv = \tan 3\theta \cdot 3 d\theta$

$\frac{1}{3} \tan 3\theta - \theta + C$

$\frac{1}{3} (\tan 3\theta - 3\theta) + C$

$\frac{\sin^2\theta + \cos^2\theta}{\cos^2\theta} = \frac{1}{\cos^2\theta}$

$\tan^2\theta + 1 = \sec^2\theta$

45) $\int \frac{t+1}{t}\,dt = \int \left(\frac{t}{t}+\frac{1}{t}\right)dt$

$= \int \left(1+\frac{1}{t}\right)dt$

$= \int dt + \int \frac{dt}{t}$

$= t + \ln t + C$