4.4 #45-55 odd; 75-91 odd
4.5 #5-25 odd; 33-61 odd
5.2 #1-37 odd; 49-55 odd; 63, 65
5.4 #91-117 odd
5.5 #71-82 all
5.7 #1-45 odd
Ch 5 Review pp.393-394 #15-22, 47-54,65-66, 77-82

$$\int e^x dx = e^x + c \qquad \int \frac{du}{u} = \ln|u| + K$$

$$\int a^x dx = \frac{a^x}{\ln a} + c$$

$$\frac{d}{dx}[\arcsin u] = \frac{u'}{\sqrt{1-u^2}} \qquad \int \frac{du}{\sqrt{a^2-u^2}} = \arcsin\frac{u}{a} + c$$

$$\frac{d}{dx}[\arctan u] = \frac{u'}{1+u^2} \qquad \int \frac{du}{a^2+u^2} = \frac{1}{a}\arctan\frac{u}{a} + c$$

$$\frac{d}{dx}[\operatorname{arcsec} u] = \frac{u'}{|u|\sqrt{u^2-1}} \qquad \int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}\operatorname{arcsec}\frac{|u|}{a} + c$$

$$42.\ \int \frac{x}{\sqrt{9+8x^2-x^4}}\,dx = \int \frac{x\,dx}{\sqrt{5^2-(x^2-4)^2}}$$

$9 - (x^4 - 8x^2 + 16)$
$+16$

$u = x^2 - 4$
$du = 2x\,dx$
$\frac{1}{2}du = x\,dx$

$$= \int \frac{\frac{1}{2}du}{\sqrt{5^2-u^2}} = \frac{1}{2}\arcsin\frac{x^2-4}{5} + C$$

40. $\int \frac{1}{(x-1)\sqrt{x^2-2x}}\,dx = \int \frac{dx}{(x-1)\sqrt{x^2-2x+1-1}}$

$= \int \frac{dx}{(x-1)\sqrt{(x-1)^2-1^2}} = \boxed{\text{arcsec}|x-1| + C}$

$u = x-1$

$du = x$

ch 5 Review p407

100. $\int \frac{1}{3+25x^2}\,dx = \int \frac{dx}{(\sqrt{3})^2+(5x)^2} = \int \frac{\frac{1}{5}\,du}{(\sqrt{3})^2+u^2}$

$25\left(\frac{3}{25}+x^2\right)$

$u = 5x$

$du = 5dx$

$\frac{1}{5}\,du = dx$

$= \frac{1}{5}\cdot\frac{1}{\sqrt{3}}\arctan\frac{5x}{\sqrt{3}} + C$

$= \frac{1}{25}\cdot\frac{5}{\sqrt{3}}\arctan\frac{5x}{\sqrt{3}} + C$

$= \boxed{\frac{1}{5\sqrt{3}}\arctan\frac{5x}{\sqrt{3}} + C}$

104. $\int \frac{4-x}{\sqrt{4-x^2}}\,dx$

$= \int \frac{4\,dx}{\sqrt{4-x^2}} - \int \frac{x\,dx}{\sqrt{4-x^2}}$

$u = 4-x^2$
$du = -2x\,dx$
$-\frac{1}{2}du = x\,dx$

$= 4\arcsin\frac{x}{2} + \frac{1}{2}\int \frac{du}{\sqrt{u}}$

$= 4\arcsin\frac{x}{2} + \frac{1}{2}\int u^{-1/2}\,du$

$= \boxed{4\arcsin\frac{x}{2} + \sqrt{4-x^2} + C}$

$\uparrow \frac{1}{2}\cdot 2u^{1/2}$

105. $\int \frac{\arctan(x/2)}{4+x^2}\,dx = \int \frac{1}{2}u\,du = \boxed{\frac{1}{4}\arctan^2\frac{x}{2} + C}$

$u = \arctan\frac{x}{2}$

$du = \frac{1}{1+\left(\frac{x}{2}\right)^2}\cdot\frac{1}{2}\,dx$

$2du = \frac{1\,dx}{1+\frac{x^2}{4}}\cdot\frac{4}{4}$

$2du = \frac{4\,dx}{4+x^2}$

$\frac{1}{2}du = \frac{dx}{4+x^2}$

$$\int_0^{\pi/4} \tan\left(\frac{\pi}{4}-x\right)dx$$

$du = -dx$

$-du = dx$

$$\int_0^{\pi/4} -\tan u\,du$$

$$= \ln|\cos u| + C$$

$$= \ln\left|\cos\left(\frac{\pi}{4}-x\right)\right| + C$$

$$= \ln\cos\left(\frac{\pi}{4}\right) + C - \ln\cos 0 + C$$

$$= \frac{\sqrt{2}}{2} + 1 = \frac{\sqrt{2}+2}{2}$$

$$\int_0^4 (2+x)\,dx$$

$$= 2x + \frac{1}{2}x^2 \Big|_0^4$$

$$8 + 8 - 0$$

16. ✓

$$\int \frac{\cos x}{\sqrt{\sin x}}\,dx \qquad u = \sin x$$

$$du = -\cos x\,dx$$

$$-du = \cos x\,dx$$

$$\int \frac{-du}{\sqrt{u}}$$

$$\int -u^{-\frac{1}{2}}\,du$$

$$= -2u^{\frac{1}{2}}$$

$$-2\sqrt{(\sin x)}$$ ☺

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

$$du = (2x+6)\,dx$$

$$du = (x+3)2\,dx$$

$$\tfrac{1}{2}\,du = (x+3)\,dx$$

$$= \int \frac{\frac{1}{2}}{u^2}\,du$$

$$= \tfrac{1}{2}u^{-2}\,du$$

$$= -\tfrac{1}{2}u^{-1} = \frac{-\frac{1}{2}}{x^2+6x-5} = -$$