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

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

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

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

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

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

108. $\int \ln(e^{2x-1})dx = \int (2x-1)dx$

$= \boxed{x^2 - x + c}$

5.5

$u = \sin x$

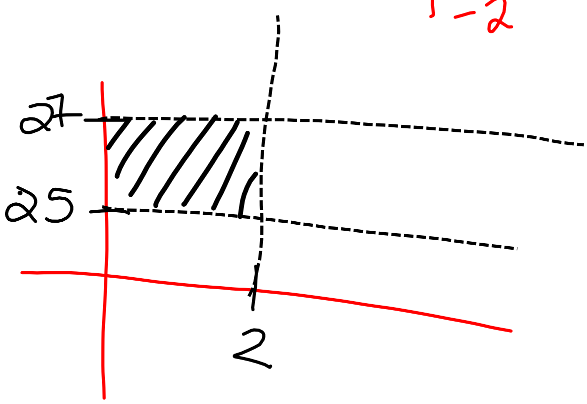
$du = \cos x\,dx$

68. $\displaystyle\int 2^{\sin x} \cos x\,dx = \int 2^u\,du$

$\displaystyle = \frac{1}{\ln 2} 2^u + C = \boxed{\frac{2^{\sin x}}{\ln 2} + C}$

64. $\displaystyle\int_{-2}^{0} (3^3 - 5^2)\,dx = \int_{-2}^{0} 2\,dx$

$\displaystyle = 2x \Big|_{-2}^{0} = 2(0) - 2(-2) = \boxed{4}$



5.4

102. $\int \frac{2e^x - 2e^{-x}}{(e^x + e^{-x})^2}\,dx = \int \frac{2\,du}{u^2} = \int 2u^{-2}\,du$

$2(e^x - e^{-x})$

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

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

$= \frac{-2}{u} + C$

$= \boxed{\frac{-2}{e^x + e^{-x}} + C}$

2. $\int \frac{3\,dx}{\sqrt{1 - 4x^2}} = \int \frac{3\,dx}{\sqrt{1^2 - (2x)^2}}$

$a = 1$

$u = 2x$

$du = 2\,dx$

$\frac{3}{2}\,du = 3\,dx$

$= \int \frac{\frac{3}{2}\,du}{\sqrt{1^2 - u^2}} = \boxed{\frac{3}{2}\arcsin\frac{2x}{1} + C}$

8. $$\int_{\sqrt{3}}^{3} \frac{1}{9+x^2}\,dx = \int_{\sqrt{3}}^{3} \frac{1}{3^2+x^2}\,dx$$ $a=3$, $u=x$

$$= \frac{1}{3}\arctan\frac{x}{3}\Big|_{\sqrt{3}}^{3} = \frac{1}{3}\arctan 1 - \frac{1}{3}\arctan\frac{1}{\sqrt{3}}$$

$$= \frac{1}{3}\left(\frac{\pi}{4}\right) - \frac{1}{3}\left(\frac{\pi}{6}\right)$$

$$= \frac{3}{3}\cdot\frac{\pi}{12} - \frac{\pi}{18}\cdot\frac{2}{2} = \boxed{\frac{\pi}{36}}$$

12. $$\int \frac{x^4-1}{x^2+1}\,dx = \int \frac{(x^2-1)\cancel{(x^2+1)}}{\cancel{x^2+1}}\,dx$$

$$= \int (x^2-1)\,dx = \boxed{\frac{1}{3}x^3 - x + C}$$

16. $\int \frac{1}{x\sqrt{x^4-4}}\,dx = \boxed{\frac{1}{2}\operatorname{arcsec}\frac{|x|}{2} + C}$

30. $\int \frac{x-2}{(x+1)^2+4}\,dx = \int \frac{x\,dx}{(x+1)^2+4} - 2\int \frac{dx}{(x+1)^2+4}$

$= \int \frac{x\,dx}{x^2+2x+5}$

$u = x^2+2x+5$

$du = (2x+2)dx$

$du = 2(x+1)dx$

$\frac{1}{2}du = (x+1)dx$

$u = x+1$

$du = dx$

$-2\int \frac{du}{u^2+2^2}$

$-\cancel{2}\cdot\frac{1}{\cancel{2}}\arctan\frac{x+1}{2} + C$

30. $\int \frac{x-2}{(x+1)^2+4}\,dx = \int \frac{x+1-3}{(x+1)^2+4}\,dx$

$$= \int \frac{x+1}{\underbrace{(x+1)^2+4}_{x^2+2x+5}}\,dx - 3\int \frac{dx}{(x+1)^2+4}$$

$u=$

$du = 2x+2\,dx$

$= 2(x+1)dx$

$\frac{1}{2}du = (x+1)dx$

$= \int \frac{\frac{1}{2}du}{u} = \frac{1}{2}\ln|x^2+2x+5|$

$-\frac{3}{2}\arctan\frac{x+1}{2} + C$

$$= \boxed{\frac{1}{2}\ln|x^2+2x+5| - \frac{3}{2}\arctan\frac{x+1}{2} + c}$$

completing the square:

$ax^2+bx+c \sim A(x-h)^2+K$

$a(x^2+\frac{b}{a}x) + c$

$a\left(x^2+\frac{b}{a}x+\left(\frac{b}{2a}\right)^2\right)+c-\frac{b^2}{4a}$

$a\left(x+\frac{b}{2a}\right)^2+\frac{4ac-b^2}{4a}$

$(a+b)^2 = a^2+2ab+b^2$

$(a-b)^2 = a^2-2ab+b^2$

32. $$\int_{-2}^{2} \frac{dx}{x^2+4x+13}$$

$$x^2+4x+13$$

$$\underbrace{x^2+4x+4}_{(x+2)^2} + 9$$

$$(x+2)^2 + 3^2$$

$$= \int_{-2}^{2} \frac{dx}{(x+2)^2+3^2}$$

$$= \frac{1}{3}\arctan\frac{x+2}{3}\Bigg|_{-2}^{2} = \frac{1}{3}\arctan\frac{4}{3} - \frac{1}{3}\cancelto{0}{\arctan 0}$$

$$= \boxed{\frac{1}{3}\arctan\frac{4}{3}}$$