4.3.131

$$\int\frac{dz}{a+b\sin z}=\frac{2}{(a^2-b^2)^{\frac{1}{2}}}\arctan\frac{a\tan\left(\frac{z}{2}\right)+b}{(a^2-b^2)^{\frac{1}{2}}}\qquad(a^2>b^2)$$

$$=\frac{1}{(b^2-a^2)^{\frac{1}{2}}}\ln\left[\frac{a\tan\left(\frac{z}{2}\right)+b-(b^2-a^2)^{\frac{1}{2}}}{a\tan\left(\frac{z}{2}\right)+b+(b^2-a^2)^{\frac{1}{2}}}\right]\qquad(b^2>a^2)$$

4.3.132 $$\int\frac{dz}{1\pm\sin z}=\mp\tan\left(\frac{\pi}{4}\mp\frac{z}{2}\right)$$

4.3.133

$$\int\frac{dz}{a+b\cos z}=\frac{2}{(a^2-b^2)^{\frac{1}{2}}}\arctan\frac{(a-b)\tan\frac{z}{2}}{(a^2-b^2)^{\frac{1}{2}}}\qquad(a^2>b^2)$$

$$=\frac{1}{(b^2-a^2)^{\frac{1}{2}}}\ln\left[\frac{(b-a)\tan\frac{z}{2}+(b^2-a^2)^{\frac{1}{2}}}{(b-a)\tan\frac{z}{2}-(b^2-a^2)^{\frac{1}{2}}}\right]\qquad(b^2>a^2)$$

4.3.134 $$\int\frac{dz}{1+\cos z}=\tan\frac{z}{2}$$

4.3.135 $$\int\frac{dz}{1-\cos z}=-\cot\frac{z}{2}$$

4.3.136

$$\int e^{az}\sin bz\,dz=\frac{e^{az}}{a^2+b^2}(a\sin bz-b\cos bz)$$

4.3.137

$$\int e^{az}\cos bz\,dz=\frac{e^{az}}{a^2+b^2}(a\cos bz+b\sin bz)$$

4.3.138

$$\int e^{az}\sin^n bz\,dz=\frac{e^{az}\sin^{n-1}bz}{a^2+n^2b^2}(a\sin bz-nb\cos bz)+\frac{n(n-1)b^2}{a^2+n^2b^2}\int e^{az}\sin^{n-2}bz\,dz$$

4.3.139

$$\int e^{az}\cos^n bz\,dz=\frac{e^{az}\cos^{n-1}bz}{a^2+n^2b^2}(a\cos bz+nb\sin bz)+\frac{n(n-1)b^2}{a^2+n^2b^2}\int e^{az}\cos^{n-2}bz\,dz$$

Definite Integrals

4.3.140 $$\int_0^\pi\sin mt\sin nt\,dt=0$$

($m\neq n$, m and n integers)

$$\int_0^\pi\cos mt\cos nt\,dt=0$$

4.3.141 $$\int_0^\pi\sin^2 nt\,dt=\int_0^\pi\cos^2 nt\,dt=\frac{\pi}{2}$$

(n an integer, $n\neq0$)

4.3.142 $$\int_0^\infty\frac{\sin mt}{t}dt=\frac{\pi}{2}\qquad(m>0)$$

$$=0\qquad(m=0)$$

$$=-\frac{\pi}{2}\qquad(m<0)$$

4.3.143 $$\int_0^\infty\frac{\cos at-\cos bt}{t}dt=\ln(b/a)$$

4.3.144 $$\int_0^\infty\sin t^2\,dt=\int_0^\infty\cos t^2\,dt=\frac{1}{2}\sqrt{\frac{\pi}{2}}$$

4.3.145

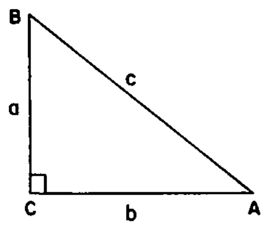
$$\int_0^{\pi/2}\ln\sin t\,dt=\int_0^{\pi/2}\ln\cos t\,dt=-\frac{\pi}{2}\ln 2$$

4.3.146 $$\int_0^\infty\frac{\cos mt}{1+t^2}dt=\frac{\pi}{2}e^{-m}$$

(See chapters 5 and 7 for other integrals involving circular functions.)
(See [5.3] for Fourier transforms.)

4.3.147

Formulas for Solution of Plane Right Triangles



If A, B and C are the vertices (C the right angle), and a, b and c the sides opposite respectively,

$$\sin A=\frac{a}{c}=\frac{1}{\csc A}$$

$$\cos A=\frac{b}{c}=\frac{1}{\sec A}$$

$$\tan A=\frac{a}{b}=\frac{1}{\cot A}$$

versine A=vers $A=1-\cos A$

coversine A=covers $A=1-\sin A$

haversine A=hav $A=\frac{1}{2}$ vers A

exsecant A=exsec $A=\sec A-1$