

## Chapter 23

# Key To Selected Problems

### Chapter 3

Note: a constant of integration should be added to all indefinite integrals.

- 3.1.  $\frac{5}{7}t^{7/5} + \frac{8}{3}t^{3/2} + 7\cos(t)$   
3.2.  $te^t - e^t$   
3.3.  $\frac{1}{2}(\ln(5t))^2$   
3.4.  $\frac{t^5}{15} + 8\ln|t|$   
3.5.  $\frac{1}{5}e^{5t}$   
3.6.  $\frac{3}{t-3} + 2\ln|t-3|$   
3.7.  $\frac{1}{4}t^4\ln|t| - \frac{t^4}{16}$   
3.8.  $(t+1)\arctan(\sqrt{t}) - \sqrt{t}$   
3.9.  $2\sqrt{t-e}$   
3.10.  $5\ln|y+1| + 3\arctan(y)$   
3.11.  $-\frac{1}{3}(3+2\cos(t))^{3/2}$   
3.12.  $\frac{1}{3}e^{t^3}$   
3.13.  $\frac{2}{9}u^{9/2} + \frac{4}{5}u^{5/2} + 2\sqrt{u}$   
3.14.  $\frac{1}{4}\sin(2t) - \frac{1}{2}t\cos(2t)$   
3.15.  $te^t$   
3.16.  $-e^{\frac{1}{t}}$   
3.17.  $\frac{3}{7}t^{7/3} + 6\cos(t)$   
3.18.  $\frac{t^6}{12} - 14\sqrt{t}$   
3.19.  $\frac{2}{3}$   
3.20.  $6(\ln 2)^2$   
3.21.  $\frac{3}{2}$   
3.22.  $(1+e^t)\ln(1+e^t) - 1 - e^t$   
3.23.  $\frac{1}{5}t^5\ln(t) - \frac{1}{25}t^5$   
3.24.  $(\sin(t)-1)e^{\sin(t)}$   
3.25.  $t\arctan(t) - \frac{1}{2}\ln(1+t^2)$   
3.26.  $-\sqrt{1-u^2}$   
3.27.  $2\ln|w+2| + \ln(w^2+6) - \frac{5}{\sqrt{6}}\arctan\left(\frac{w}{\sqrt{6}}\right)$   
3.28.  $\frac{2}{3}t^{3/2}\ln t - \frac{4}{9}t^{3/2}$   
3.29.  $-\frac{1}{e^t+2}$   
3.30.  $\frac{1}{e^2+1}$   
3.31.  $4\sqrt{y-1} + \frac{2}{3}(y-1)^{3/2}$   
3.32.  $\ln|t+6| + 3\ln|t+3|$   
3.33.  $\frac{3}{7}t^{7/3} - \frac{4}{3}t^{3/2} + \frac{3}{2}\sin(2t)$   
3.34.  $\frac{t^5}{15} + \frac{6}{t}$   
3.35.  $\frac{1}{5}\sin(\sin(2t))$   
3.36.  $\frac{2}{3}(t-1)^{3/2} + \frac{2}{5}(t-1)^{5/2}$   
3.37.  $2\ln(e^t+t^2)$   
3.38.  $\frac{1}{7}t^7\ln(2t) - \frac{t^7}{49}$   
3.39.  $\frac{1}{3}\ln\left(\frac{e^6+1}{e^3+1}\right)$   
3.40.  $-\ln|t+1| + \frac{1}{2}\ln(t^2+1) + 2\arctan t$   
3.41.  $\frac{1}{2}\arctan(t^2)$   
3.42.  $\frac{1}{5}\ln(\sin(2t)+1)$   
3.43.  $\frac{1}{9}\cos(3t) + \frac{1}{3}t\sin(3t)$   
3.44.  $2\ln|t+3| - \ln|t-2|$   
3.45.  $\frac{3}{4}t^{4/3}(\ln(t) - \frac{3}{4})$   
3.46.  $2e^{\sqrt{t}}$   
3.47.  $t + \ln|t-1|$   
3.48.  $\sqrt{2t-3}$

- 3.49.  $\frac{1}{3}t^3 - \frac{1}{4}\ln|t|$   
 3.50.  $\frac{3}{4}t^{4/3} + \frac{2}{3}t^{3/2} + 5\sin(t)$   
 3.51.  $-\frac{2}{t+1} + \ln|t+2|$   
 3.52.  $(-\frac{1}{5}t^4 - \frac{4}{15}t^2 - \frac{8}{15})\sqrt{1-t^2}$   
 3.53.  $\frac{1}{9}(e^t + t^2)^9$   
 3.54.  $t$   
 3.55.  $\frac{1}{3}t^3\ln(t) - \frac{1}{9}t^3$   
 3.56.  $\frac{1}{2}\ln(e^{2t} + 1)$   
 3.57.  $\frac{1}{5}e^{w^5}$   
 3.58.  $-3\ln|-1+2t| + \ln(t^2 + 3t + 3)$   
 3.59.  $0$   
 3.60.  $\frac{2}{9}t^{3/2} + \frac{2}{3}\ln(t)$   
 3.61.  $-2\ln|t+4| + \frac{5}{2}\ln(t^2+1) - 2\arctan(t)$   
 3.62.  $\frac{2}{3}\sqrt{3t+\pi}$   
 3.63.  $\frac{1}{3}(\ln(2t))^3$   
 3.64.  $\frac{t^4}{4} + \ln|t|$   
 3.65.  $\frac{4}{3}t^{3/4} - 3\cos(t) + \frac{2}{3}t^{3/2}$   
 3.66.  $-\frac{5}{2}\ln(e^{2t} + 1) + 5t$   
 3.67.  $\frac{2}{3}(t + \sin(t))^{3/2}$   
 3.68.  $-\cos(\ln(2t))$   
 3.69.  $0$   
 3.70.  $-\frac{4}{t-1} + 3\ln|t-1|$   
 3.71.  $t\arccos(t) - \sqrt{1-t^2}$   
 3.72.  $0$   
 3.73.  $\frac{1}{5}\sin w^5$   
 3.74.  $(t+2)\ln(t+2) - t - 2$   
 3.75.  $\frac{4}{5}(t+2)^{5/2} - 2(t+2)^{3/2}$   
 3.76.  $-\frac{1}{t-1} + 2\ln|t|$   
 3.77.  $-2\sqrt{t} + \frac{2}{3}t^{3/2}$   
 3.78.  $e^t - \frac{1}{e^t}$   
 3.79.  $-t + \frac{t^2}{2} + \ln|t+1|$   
 3.80.  $-\frac{1}{\ln(t)}$   
 3.81.  $\frac{1}{2}\arcsin(2t)$   
 3.82.  $1$   
 3.83.  $-\cos t + \frac{2}{3}\cos^3 t - \frac{1}{5}\cos^5 t$   
 3.84.  $-\ln(\cos t)$   
 3.85.  $3/2$   
 3.86.  $5/24$   
 3.87.  $-\frac{1}{1+\sec\alpha}$   
 3.88.  $\sec t$   
 3.89.  $\frac{1}{5}\sec^5\theta$   
 3.90.  $2e^{\sqrt{t}}(\sqrt{t}-1)$   
 3.91.  $2\sqrt{t} - 2\ln(\sqrt{t}+1)$   
 3.92.  $\frac{1}{4}\sin 2t + \frac{t}{2}$   
 3.93.  $\frac{3}{8}t - \frac{1}{4}\sin 2t + \frac{1}{32}\sin 4t$   
 3.94.  $\arctan(\ln s)$   
 3.95.  $-e^{-1} + 1$   
 3.96.  $\frac{1}{6}\sin 3t - \frac{1}{14}\sin 7t$   
 3.97.  $-\frac{1}{3}\cos^3 t + \frac{1}{5}\cos^5 t$   
 3.98.  $\frac{1}{2}t\sqrt{4-t^2} + 2\arcsin\frac{t}{2}$   
 3.99.  $-\frac{1}{4(t^2-2t+3)^4}$   
 3.100.  $\ln|y| + \ln(y^2+1) + \arctan y$   
 3.101.  $2/3$   
 3.102.  $\frac{1}{4}\sin^4 t$   
 3.103.  $\arctan(t-3)$   
 3.104.  $\frac{1}{3}(r^2+4)^{3/2}$   
 3.105.  $3/2$   
 3.106.  $52/55$   
 3.107.  $4 - 2\ln 3$   
 3.108.  $-\frac{1}{2^t \ln 2}$   
 3.109.  $-\frac{1}{8}\cos 4t - \frac{1}{4}\cos 2t$   
 3.110.  $\frac{1}{4}\sin 2t + \frac{1}{12}\sin 6t$   
 3.111.  $\frac{1}{2}t^2 e^{t^2} - \frac{1}{2}e^{t^2}$   
 3.112.  $\frac{1}{5}\sec^5 t - \frac{1}{3}\sec^3 t$   
 3.113.  $\frac{\tan t - t}{\sqrt{t^2-9}}$   
 3.114.  $\frac{1}{9}\frac{t}{\sqrt{t^2+9}}$   
 3.115.  $\frac{1}{3}t^2\sqrt{t^2+9} - 6\sqrt{t^2+9}$   
 3.116.  $\pi/4$