1 Chapter 8

8.1.4: $-xe^{-x} - e^{-x} + C$.

8.1.6: $-\frac{1}{2}t\cos 2t + \frac{1}{4}\sin 2t + C$.

8.1.8: $\frac{1}{m}x^2\sin mx + \frac{2}{m^2}x\cos mx - \frac{2}{m^3}\sin mx + C$.

8.1.16: $\frac{2}{5}e^{-\theta}\sin 2\theta - \frac{1}{5}e^{-\theta}\cos 2\theta + C$.

8.1.20: $-6e^{-1} + 3$.

8.1.22: $\frac{16}{3}\ln 4 - \frac{28}{9}$.

8.1.24: $\frac{\pi}{4} + \frac{1}{2}\ln 2$.

8.1.26: $\frac{5}{\ln 5} - \frac{4}{(\ln 5)^2}$.

8.1.28: $\frac{\pi\sqrt{3}}{6} - \frac{\pi}{2} + \frac{1}{2}\ln 2$.

8.1.30: $\frac{16}{3} - \frac{7}{3}\sqrt{5}$.

8.1.32: $\frac{1}{2}(e^t - \cos t - \sin t)$.

8.1.42:

$$a) \int \cos^n x \, dx = \frac{1}{n}\cos^{n-1} x \sin x + \frac{n-1}{n}\int \cos^{n-2} x \, dx.$$

$$b) \frac{x}{2} + \frac{\sin 2x}{4} + C.$$

$$c) \frac{1}{4}\cos^3 x \sin x + \frac{3}{8}x + \frac{3}{16}\sin 2x + C.$$

8.1.48: $\int \sec^n x \, dx = \frac{\tan x \sec^{n-2} x}{n-1} + \frac{n-2}{n-1}\int \sec^{n-2} x \, dx..$

8.2.4: $\frac{8}{15}$.

8.2.6: $\frac{1}{3m}\cos^3 mx - \frac{1}{m}\cos mx + C$.

8.2.14: $\frac{\pi}{16}$.

8.2.16: $\sin(\sin\theta) - \frac{2}{3}\sin^3(\sin\theta) + \frac{1}{5}\sin^5(\sin\theta) + C$.

8.2.26: $\frac{12}{35}$.

8.2.28: $\frac{1}{14}\sec^7(2x) - \frac{1}{10}\sec^5(2x) + C$.

8.3.6: $\frac{64}{15}(\sqrt{2}+1)$.

8.3.10: $\frac{1}{15}\sqrt{t^2+2}(3t^4 - 8t^2 + 32) + C$.

8.3.20: $-\sqrt{25-t^2} + C$.

8.3.22: $\frac{1}{2}(\sqrt{2} + \ln(1+\sqrt{2}))$.

8.3.24: $\ln|\sqrt{t^2-6t+13}+t-3| + C$.

8.3.26: $6\sin^{-1}\left(\frac{x-2}{2}\right) - 4\sqrt{4x-x^2} - \left(\frac{x-2}{2}\right)\sqrt{4x-x^2} + C$.

8.4.2:

$$a)\,\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x+1}.$$
$$b)\,\frac{A}{x} + \frac{Bx+C}{x^2+1}.$$

8.4.4:

$$a)\,x - 4 + \frac{A}{x+1} + \frac{B}{x+3}.$$
$$b)\,\frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{(x+1)^3} + \frac{Dx+E}{x^2+4} + \frac{Fx+G}{(x^2+4)^2}.$$

8.4.6:

$$a)\,\frac{Ax+B}{x^2+1} + \frac{Cx+D}{x^2-x+3}.$$
$$b)\,\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3} + \frac{D}{x-1} + \frac{Ex+F}{x^2+x+1}.$$

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8.4.8: $\frac{1}{2}r^2 - 4r + 16\ln|r+4| + C$.

8.4.10: $\frac{1}{5}\ln\left|\frac{t-1}{t+4}\right| + C$.

8.4.14: If $a \neq b$ then the integral is $\frac{1}{b-a}\ln\left|\frac{x+a}{x+b}\right| + C$. If $a = b$, then the integral is $-\frac{1}{x+a} + C$.

8.4.20: $\frac{9}{25}\ln|x-3| + \frac{16}{25}\ln|x+2| + \frac{4}{5(x+2)} + C$.

8.4.22: $2\ln|s| - \frac{1}{s} - 2\ln|s-1| - \frac{1}{s-1} + C$.

8.4.30: $\tan^{-1}x + \frac{1}{2}\ln(x^2+4) - \frac{3}{2}\tan^{-1}(\frac{x}{2}) + C$.

8.4.46: $\frac{3}{2}x^{2/3} - \frac{12}{7}x^{7/12} + 2\sqrt{x} - \frac{12}{5}x^{5/12} + 3\sqrt[3]{x} - 4\sqrt[4]{x} + 6\sqrt[6]{x} - 12\sqrt[12]{x} + 12\ln(\sqrt[12]{x}+1) + C$.

8.5.2: $\frac{1}{2}\tan^2\theta + \ln|\cos\theta| + C$.

8.5.4: $\frac{1}{2}\sin^{-1}\frac{x^2\sqrt{3}}{3} + C$.

8.5.10: $\frac{\sqrt{3}}{3}\tan^{-1}\left(\frac{2\sqrt{3}}{3}(x^2 + \frac{1}{2})\right) + C$.

8.5.12: $-\sin(\cos x) + C$.

8.5.18: $\frac{1}{2}\tan^{-1}(e^{2t}) + C$.

8.5.38: $\frac{2}{105}(11\sqrt{2} - 4)$.

8.5.42: $\frac{1}{3}x^3\tan^{-1}x - \frac{1}{6}x^2 + \frac{1}{6}\ln(x^2+1) + C$.

8.5.56: $\sqrt{x^2-1}\ln x - \sqrt{x^2-1} + \tan^{-1}\sqrt{x^2-1} + C$.

8.7.20c: $n \geq 159$.

8.8.2:

a) Proper.
b) Type II Improper.
c) Type I Improper.
d) Type II Improper.

8.8.6: Divergent.

8.8.10: Divergent.

8.8.16: Divergent.

8.8.28: Divergent.

8.8.32: $\frac{\pi}{2}$.

8.8.34: Divergent.

8.8.40: -4.

8.8.50: Divergent.

8.8.52: Convergent.