1. Soluciones:

$$a)\ \int (x^2+3x)\Big(5x^3-\frac{8}{x^3}\Big)\,dx = \frac{5}{6}\,x^6+3x^5+\frac{24}{x}-8\,\ln(x)+C$$

$$b)\ \int \Big(e^x(e^x-e^{-x})+\frac{1}{5x-2}\Big)\,dx = \frac{1}{2}\,e^{2x}-x+\frac{1}{5}\,\ln(5x-2)+C$$

$$c)\ \int \Big(3\,\mathrm{sen}(5x)-\frac{x}{2}-\frac{5}{1+4x^2}\Big)\,dx = -\frac{3}{5}\,\cos(5x)-\frac{1}{4}\,x^2-\frac{5}{2}\,\arctan(2x)+C$$

$$d)\ \int \Big(\frac{x}{1+x^2}+\frac{2}{(4x+1)^2}+\frac{4}{\sqrt{1-2x^2}}\Big)\,dx = \frac{1}{2}\,\ln(1+x^2)-\frac{1}{2}\,\frac{1}{4x+1}+2\sqrt{2}\,\arcsin(\sqrt{2}x)+C$$

2. Soluciones:

$$a)\ \int (x+2)\,2^x\,dx = \frac{2^x}{\ln(2)}\Big(x+2-\frac{1}{\ln(2)}\Big)+C$$

$$b)\ \int (x^2-2x)e^{-5x+3}\,dx = \frac{e^{-5x+3}}{125}\,\Big[-(-5x+3)^2-2\,(-5x+3)+23\Big]+C$$

$$c)\ \int x\,\cos(5x)\,dx = \frac{1}{25}\,\cos(5x)+\frac{1}{5}\,x\,\sin(5x)+C$$

$$d)\ \int \mathrm{sen}(x)\,e^{-x}\,dx = -\frac{e^{-x}}{2}\,\big(\cos(x)+\sin(x)\big)+C$$

$$e)\ \int x\sqrt{x+1}\,dx = \frac{2}{5}\,(x+1)^{5/2}-\frac{2}{3}\,(x+1)^{3/2}+C$$

3. Solución:

$$\int_0^{\pi/2} \mathrm{sen}^7\,x\,dx = \frac{8}{15}.$$

4. Soluciones:

$$a)\ \int \frac{x}{(x+1)(x-3)}\,dx = \frac{1}{4}\,\ln(x+1)+\frac{3}{4}\,\ln(x-3)+C$$

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

$$c)\ \int \frac{2}{(x-1)(x+3)^2}\,dx = \frac{1}{8}\,\ln(x-1)+\frac{1}{2}\,\frac{1}{x+3}-\frac{1}{8}\,\ln(x+3)+C$$

$$d)\ \int \frac{5x^2+5}{(x^2-1)(x^2+2x+2)}\,dx = \ln(x-1)-5\,\ln(x+1)+2\,\ln(x^2+2x+2)+3\,\arctan(x+1)+C$$

9. Soluciones:

$$a)\quad \int_0^1 \frac{1}{e^x + 4e^{-x}}\, dx = \frac{1}{2}\big(\arctan(e/2) - \arctan(1/2)\big)$$

$$a)\quad \int_0^1 \frac{e^{2x}}{\sqrt{e^x + 1}}\, dx = \frac{2}{3}\,(1+e)^{3/2} - 2\sqrt{1+e} + \frac{2}{3}\sqrt{2}$$

$$c)\quad \int_0^1 \frac{4^x + 1}{2^x + 1}\, dx = \frac{1}{\ln(2)}\big(-2\,\ln(3) + 3\,\ln(2) + 1\big)$$

$$d)\quad \int_0^1 \frac{x}{\sqrt{1+x^4}}\, dx = \frac{1}{2}\,\operatorname{arctanh}(\sqrt{2}/2)$$

10. Soluciones

$$a)\quad \int_0^{\pi/4} \operatorname{tg}(x)\, dx = \frac{1}{2}\,\ln(2) \qquad b)\quad \int_0^{\pi/4} \cos^4(x)\, dx = \frac{1}{4} + \frac{3}{32}\,\pi$$

$$c)\quad \int_0^{\pi/4} \operatorname{tg}^2(x)\, dx = 1 - \frac{\pi}{4} \qquad d)\quad \int_0^{\pi/4} \operatorname{sen}^5(x)\cos^3(x)\, dx = \frac{5}{384}$$

11. Soluciones:

$$a)\quad \int_0^{\pi/2} \frac{1}{\cos^2(x)}\, dx = +\infty \qquad b)\quad \int_0^{\infty} e^{-5x}\, dx = \frac{1}{5} \qquad c)\quad \int_0^1 \ln(x)\, dx = -1$$