1. $\int_0^5 \frac{x}{x+10}\,dx = \int_0^5 \left(1 - \frac{10}{x+10}\right) dx = [x - 10\ln(x+10)]_0^5 = 5 - 10\ln 15 + 10\ln 10$
$= 5 + 10\ln\frac{10}{15} = 5 + 10\ln\frac{2}{3}$

2. $\int_0^5 ye^{-0.6y}\,dy \quad \left[\begin{matrix} u = y, & dv = e^{-0.6y}dy, \\ du = dy & v = -\frac{5}{3}e^{-0.6y}\end{matrix}\right] = \left[-\frac{5}{3}ye^{-0.6y}\right]_0^5 - \int_0^5 \left(-\frac{5}{3}e^{-0.6y}\right) dy = -\frac{25}{3}e^{-3} - \frac{25}{9}\left[e^{-0.6y}\right]_0^5$
$= -\frac{25}{3}e^{-3} - \frac{25}{9}(e^{-3} - 1) = -\frac{25}{3}e^{-3} - \frac{25}{9}e^{-3} + \frac{25}{9} = \frac{25}{9} - \frac{100}{9}e^{-3}$

3. $\int_0^{\pi/2} \frac{\cos\theta}{1+\sin\theta}\,d\theta = \Big[\ln(1+\sin\theta)\Big]_0^{\pi/2} = \ln 2 - \ln 1 = \ln 2$

4. $\int_1^4 \frac{dt}{(2t+1)^3} \quad \left[\begin{matrix} u = 2t+1, \\ du = 2\,dt\end{matrix}\right] = \int_3^9 \frac{\frac{1}{2}\,du}{u^3} = \frac{-1}{4}\left[\frac{1}{u^2}\right]_3^9 = -\frac{1}{4}\left(\frac{1}{81} - \frac{1}{9}\right) = -\frac{1}{4}\left(-\frac{8}{81}\right) = \frac{2}{81}$

5. $\int_0^{\pi/2} \sin^3\theta\,\cos^2\theta\,d\theta = \int_0^{\pi/2}(1-\cos^2\theta)\cos^2\theta\,\sin\theta\,d\theta = \int_1^0 (1-u^2)u^2\,(-du) \quad \left[\begin{matrix} u = \cos\theta, \\ du = -\sin\theta\,d\theta\end{matrix}\right]$
$= \int_0^1 (u^2 - u^4)\,du = \left[\frac{1}{3}u^3 - \frac{1}{5}u^5\right]_0^1 = \left(\frac{1}{3} - \frac{1}{5}\right) - 0 = \frac{2}{15}$

6. $\frac{1}{y^2-4y-12} = \frac{1}{(y-6)(y+2)} = \frac{A}{y-6} + \frac{B}{y+2} \Rightarrow 1 = A(y+2) + B(y-6)$. Letting $y = -2 \Rightarrow B = -\frac{1}{8}$ and letting $y = 6 \Rightarrow A = \frac{1}{8}$. So $\int \frac{1}{y^2-4y-12}\,dy = \int \left(\frac{1/8}{y-6} + \frac{-1/8}{y+2}\right) dy = \frac{1}{8}\ln|y-6| - \frac{1}{8}\ln|y+2| + C.$

7. Let $u = \ln t$, $du = dt/t$. Then $\int \frac{\sin(\ln t)}{t}\,dt = \int \sin u\,du = -\cos u + C = -\cos(\ln t) + C.$

8. Let $u = \sqrt{e^x - 1}$, so that $u^2 = e^x - 1$, $2u\,du = e^x\,dx$, and $e^x = u^2 + 1$. Then
$\int \frac{1}{\sqrt{e^x-1}}\,dx = \int \frac{1}{u}\frac{2u\,du}{u^2+1} = 2\int \frac{1}{u^2+1}\,du = 2\tan^{-1} u + C = 2\tan^{-1}\sqrt{e^x-1} + C.$

9. $\int_1^4 x^{3/2}\ln x\,dx \quad \left[\begin{matrix} u = \ln x, & dv = x^{3/2}\,dx, \\ du = dx/x & v = \frac{2}{5}x^{5/2}\end{matrix}\right] = \frac{2}{5}\left[x^{5/2}\ln x\right]_1^4 - \frac{2}{5}\int_1^4 x^{3/2}\,dx = \frac{2}{5}(32\ln 4 - \ln 1) - \frac{2}{5}\left[\frac{2}{5}x^{5/2}\right]_1^4$
$= \frac{2}{5}(64\ln 2) - \frac{4}{25}(32 - 1) = \frac{128}{5}\ln 2 - \frac{124}{25} \quad \left[\text{or } \frac{64}{5}\ln 4 - \frac{124}{25}\right]$

10. Let $u = \arctan x$, $du = dx/(1+x^2)$. Then
$\int_0^1 \frac{\sqrt{\arctan x}}{1+x^2}\,dx = \int_0^{\pi/4} \sqrt{u}\,du = \frac{2}{3}\left[u^{3/2}\right]_0^{\pi/4} = \frac{2}{3}\left[\frac{\pi^{3/2}}{4^{3/2}} - 0\right] = \frac{2}{3}\cdot\frac{1}{8}\pi^{3/2} = \frac{1}{12}\pi^{3/2}.$