

1. Use $u = x + 1$, $du = dx$, $x = u - 1$:

$$\int \frac{u-1}{u} du = \int (1 - \frac{1}{u}) du = u - \ln|u| + C = x + 1 - \ln|x + 1| + C \text{ or: } x - \ln|x + 1| + D$$

3. Use $u = 3x + 5$, $\frac{1}{3} du = dx$, $x = \frac{u-5}{3}$:

$$\int \frac{1}{3} \frac{u-5}{3} \sqrt{u} du = \int (\frac{1}{9} u^{\frac{3}{2}} - \frac{5}{9} u^{\frac{1}{2}}) du = \frac{1}{9} \cdot \frac{2}{5} u^{\frac{5}{2}} - \frac{5}{9} \cdot \frac{2}{3} u^{\frac{3}{2}} + C = \frac{2}{45} (3x + 5)^{\frac{5}{2}} - \frac{10}{27} (3x + 5)^{\frac{3}{2}} + C$$

5. Use $u = t^2 + 5$, $du = 2t dt$: $\int \frac{3}{2} \sqrt{u} du = \frac{3}{2} \cdot \frac{2}{3} u^{\frac{3}{2}} + C = (t^2 + 5)^{\frac{3}{2}} + C$

7. $\int \frac{1}{5} x^\pi dx = \frac{1}{5} \cdot \frac{1}{\pi+1} x^{\pi+1} + C = \frac{x^{\pi+1}}{5(\pi+1)} + C$

9. Use $u = 1 - t$, $du = -dt$: $-\int 1.5^u du = -\frac{1}{\ln 1.5} 1.5^u + C = -\frac{1}{\ln 1.5} 1.5^{1-t} + C$

11. Use $u = 2t + 6$, $du = 2dt$, $2t = u - 6$:

$$\int \frac{u-6}{\sqrt{u}} \cdot \frac{1}{2} du = \int (\frac{1}{2} u^{\frac{1}{2}} - 3u^{-\frac{1}{2}}) du = \frac{1}{2} \cdot \frac{2}{3} u^{\frac{3}{2}} - 3 \cdot 2u^{\frac{1}{2}} + C = \frac{1}{3} (2t + 6)^{\frac{3}{2}} - 6\sqrt{2t + 6} + C$$