PROOF OF FORMULA 3.353.4

$$\int_0^1 \frac{xe^x\,dx}{(x+1)^2} = \frac{e}{2} - 1$$

The change of variable $t = x + 1$ gives

$$\int_0^1 \frac{xe^x\,dx}{(x+1)^2} = \frac{1}{e}\int_1^2 \frac{e^t}{t}dt - \frac{1}{e}\int_1^2 \frac{e^t}{t^2}\,dt.$$

Integration by parts shows that

$$\int_1^2 \frac{e^t}{t^2}dt = -\left(\frac{e^2}{2} - e\right) + \int_1^2 \frac{e^t}{t}dt.$$

This gives the result.