PROOF OF FORMULA 3.311.1

$$\int_0^\infty \frac{dx}{1+e^{px}} = \frac{\ln 2}{p}$$

Let $u = e^{px}$ to obtain

$$\int_0^\infty \frac{dx}{1+e^{px}} = \frac{1}{p}\int_1^\infty \frac{du}{u(1+u)}.$$

The result now follows by using the partial fraction decomposition

$$\frac{1}{u(1+u)} = \frac{1}{u} - \frac{1}{1+u}.$$