Exercise 1. Evaluate the definite integral $\int_1^e \frac{1}{t}(3\log(t)+1)^2$.

Exercise 2. Use integration by parts to find an antiderivative of $4x^7\sin(x^4)$.

Exercise 3. Calculate the following indefinite integral: $\int x^2 e^{-x}\mathrm{d}x$. [Hint: Watch out for the minus sign.]

Exercise 4. Find an antiderivative for the function $\log^2(x)$ using integration by parts.