For full credit, please clearly show all your work.

Problem 1

Consider the quadrature rule for the domain $\int_0^1 f(x)\,dx$ with points and weights given by:

1. $x_1 = 0,\ x_2 = \frac{1}{6},\ x_3 = 1$

2. $w_1 = -\frac{1}{2},\ w_2 = \frac{6}{5},\ w_3 = \frac{3}{10}$

What is the precision of this quadrature rule?

Problem 2

Use the quadrature rule from the previous question to approximate the integral

$$\int_1^4 e^x \, dx$$

You can leave your answer in terms of powers of e.