

5.

- (a) Derive the 2 point Gaussian quadrature formula.
- (b) Approximate the following integral using the two-point Gaussian quadrature rule and find the relative error of the approximation:

$$\int_0^2 \sin(x) dx$$

6. Determine the parameters a , b , c , d , and e so that the following function $S(x)$ is a natural cubic spline:

$$S(x) = \begin{cases} a + b(x-1) + c(x-1)^2 + d(x-1)^3; & x \in [0;1]; \\ (x-1)^3 + ex^2 - 1; & x \in [1;2]; \end{cases}$$