Additional problem for Problem Set #1

Consider the BVP:

$$-(p(x)u_{,x})_{,x} + q(x)u = f \quad x \in [0,1] \tag{1}$$
$$-p(0)u_{,x}(0) - \alpha u(0) = 0 \tag{2}$$
$$p(1)u_{,x}(1) + \beta u(1) = 0 \tag{3}$$

where p, q, and f are given functions and α and β are constants, and p (0) and p (1) are nonzero.

1. Define the spaces S and V
2. Obtain the variational equation
3. State the weak form (W)

* Note that the boundary conditions (2) and (3) are both Neumann.