Total points: 35  
Answer all questions

1. (10 pts) Solve problem 2.20
2. (10 pts) Solve problem 2.21 (i.e., solve problem 2.10 using the potential energy approach)
3. (15 pts) A steel rod is attached to the rigid walls at each end and is subjected to distributed load \( b(x) \) as shown below

\( E=30\times10^6 \text{ psi}; \quad A = 2 \text{ in}^2 \)

(a) (2 pts) Write the expression for the potential energy
(b) (10 pts) Determine the displacement \( u(x) \) using the Rayleigh-Ritz method. Assume a displacement field \( u(x) = a_0 + a_1x + a_2x^2 \). Plot \( u \) versus \( x \).
(c) (3 pts) Plot the stress in the bar \( \sigma \) as a function of \( x \)