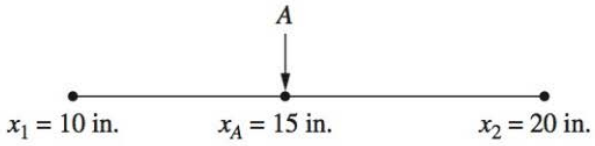
**MCE 466 – Homework Assignment #7**

Text problems 10.2 (Fig. a only), 10.11 (Fig. a only), 10.15a (Gauss quadrature only), and 4) 2-D Gauss quadrature problem

1)

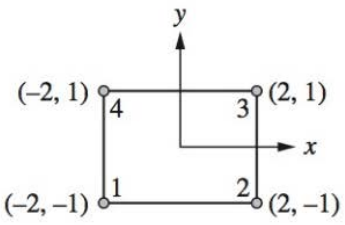
**10.2** For the two-noded one-dimensional isoparametric element shown in Figure P10–2 (a) ~~and (b),~~ with shape functions given by Eq. (10.1.5), determine (a) intrinsic coordinate $s$ at point $A$ and (b) shape functions $N_1$ and $N_2$ at point $A$. If the displacements at nodes one and two are respectively, $u_1 = 0.005$ in. and $u_2 = -0.005$ in., determine (c) the value of the displacement at point $A$ and (d) the strain in the element.




(a)

2)

**10.11** Determine the Jacobian matrix $[J]$ and its determinant for the elements shown in Figure P10–11. Show that the determinant of $[J]$ for rectangular and parallelogram shaped elements is equal to $A/4$, where A is the physical area of the element and 4 actually represents the area of the rectangle of sides $2 \times 2$ when $b = 1$ and $h = 1$ in Figure 6–20.




3)

**10.15** Use Gaussian quadature with two and three Gauss points and Table 10–2 to evaluate the following integrals:

$$\text{(a)} \int_{-1}^{1} \cos\frac{s}{2}\, ds$$

4) 2-D Gauss quadrature problem: Use 1x1, 2x2 and 3x3 Gauss quadrature to approximate the following integral:

$$\int_{-1}^{1}\int_{-1}^{1} \cos s \cos t \, ds\, dt$$