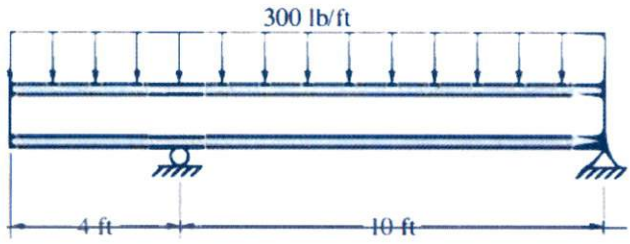
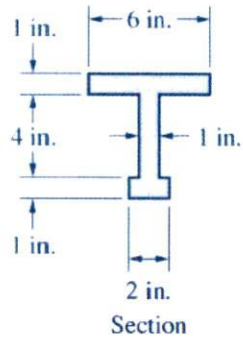
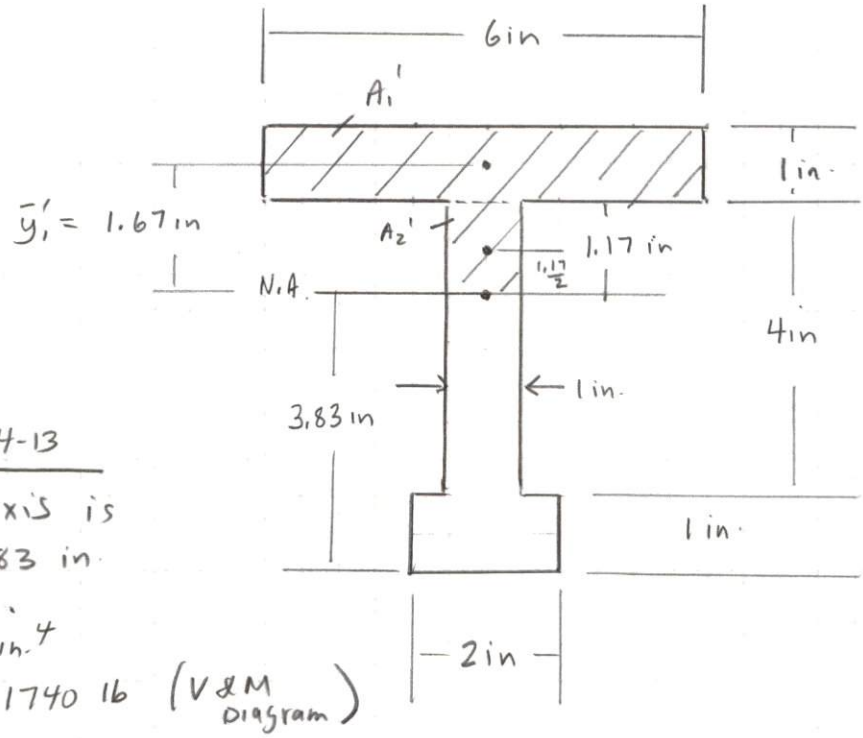
14-28

Determine the maximum shear stress in the beam shown in Fig. P14-13.

Solution.







From P 14-13

Neutral Axis is at $\bar{y} = 3.83$ in.

$I = 47.7$ in.^{4}

$|V_{MAX}| = 1740$ lb (V & M Diagram)

$$Q = (6\text{in})(1\text{in})(1.67\text{in.}) + (1\text{in.})(1.17\text{in})\left(\frac{1.17\text{in.}}{2}\right) = 10.70\text{ in.}^3$$

Shear Stress (maximum)

$$\tau_{MAX} = \tau_{N.A.} = \frac{VQ}{It} = \frac{(1740\text{ lb})(10.70\text{ in.}^3)}{47.7\text{ in.}^3\,(1\text{ in.})}$$

$$= 390 \text{ psi}$$