

6-13 $S_{ut} = 30$ kpsi, $S_{uc} = 109$ kpsi

Use M2M:

(a) $\sigma_A, \sigma_B = 20, 20$ kpsi

$$\text{Eq. (6-33a):} \quad n = \frac{30}{20} = 1.5 \quad \text{Ans.}$$

(b) $\sigma_A, \sigma_B = \pm\sqrt{(15)^2} = 15, -15$ kpsi

$$\text{Eq. (6-33a)} \quad n = \frac{30}{15} = 2 \quad \text{Ans.}$$

(c) $\sigma_A, \sigma_B = -80, -80$ kpsi

For the 3rd quadrant, there is no solution but use Eq. (6-33c).

$$\text{Eq. (6-33c):} \quad n = -\frac{109}{-80} = 1.36 \quad \text{Ans.}$$

(d) $\sigma_A, \sigma_B = 15, -25$ kpsi

Eq. (6-33b):

$$\frac{n(15)}{30} + \left(\frac{-25n + 30}{30 - 109} \right)^2 = 1$$

$$n = 1.90 \quad \text{Ans.}$$

$$\text{(a)} \quad n = \frac{OB}{OA} = \frac{4.25}{2.83} = 1.50$$

$$\text{(b)} \quad n = \frac{OD}{OC} = \frac{4.24}{2.12} = 2.00$$

$$\text{(c)} \quad n = \frac{OF}{OE} = \frac{15.5}{11.3} = 1.37 \quad \text{(3rd quadrant)}$$

$$\text{(d)} \quad n = \frac{OH}{OG} = \frac{5.3}{2.9} = 1.83$$

