SOLUTION (8.4)

Using Eq. (8.13)

$$\sigma_{\theta,\max} = p_i \frac{a^2+b^2}{b^2-a^2}$$

$$\frac{280}{2} = 7\frac{(0.6)^2+b^2}{b^2-(0.6)^2}$$

Solving, $b = 0.6308\ m$. Therefore,

$$t = b - a = 630.8 - 600 = 30.8\ mm$$

SOLUTION (3.9)

$$\varepsilon_x = \frac{\partial u}{\partial x} = -2vcx \qquad \varepsilon_y = \frac{\partial v}{\partial y} = 2ax$$

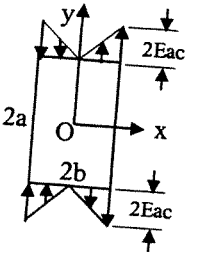
$$\gamma_{xy} = \frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} = -2cy + 2cy = 0$$

Thus

$$\sigma_x = \frac{E}{1-v^2}(\varepsilon_x + v\varepsilon_y) = 0 \qquad \tau_{xy} = G\gamma_{xy}$$

$$\sigma_y = \frac{E}{1-v^2}(\varepsilon_y + v\varepsilon_x) = 2Ecx$$

Note that this is a state of *pure bending*.




SOLUTION (3.12)

(a) We have $\nabla^4\Phi = 0$ is satisfied. The stresses are

$$\sigma_x = \frac{\partial^2\Phi}{\partial y^2} = -\frac{px}{b^3}(6b - 12y) \qquad \sigma_y = \frac{\partial^2\Phi}{\partial x^2} = 0$$

$$\tau_{xy} = -\frac{\partial^2\Phi}{\partial x \partial y} = \frac{6py}{b^3}(b - y)$$

(b)

