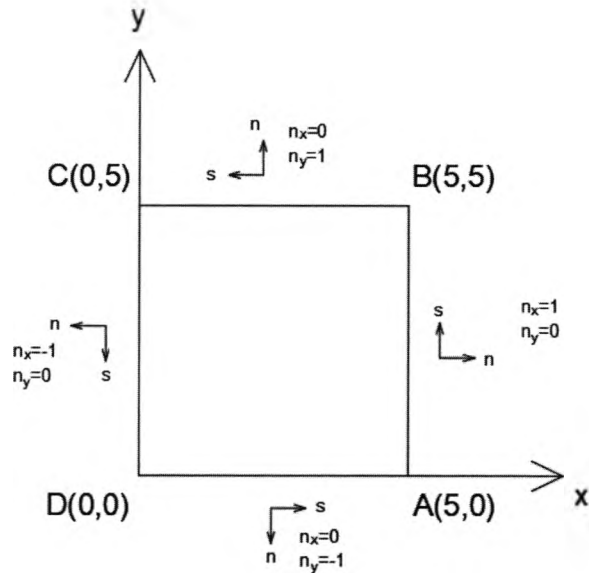**F(x,y)=6(x³+y²x)=6x³+6y²x**

$$\frac{\delta F}{\delta x} = 18x^2 + 6y^2$$

$$\frac{\delta^2 F}{\delta x^2} = 36x = \sigma_y$$

$$\frac{\delta F}{\delta y} = 12xy$$

$$\frac{\delta^2 F}{\delta y^2} = 12x = \sigma_x$$

$$\tau_{xy} = \frac{-\delta^2 F}{\delta_x \delta_y} = -12y$$

$$p_{nn} = \sigma_x n_x{}^2 + 2\tau_{xy}n_x n_y + \sigma_y n_y{}^2$$

$$p_{ns} = (\sigma_y - \sigma_x)n_x n_y + \tau_{xy}(n_x{}^2 - n_y{}^2)$$

AB:
A(5,0) B(5,5)

$n_x = 1$
$n_y = 0$
$p_{nn} = \sigma_x n_x{}^2 = 12x$

CD:
C(0,5) D(0,0)

$n_x = -1$
$n_y = 0$
$p_{nn} = \sigma_x n_x{}^2 = 12x$

BC:
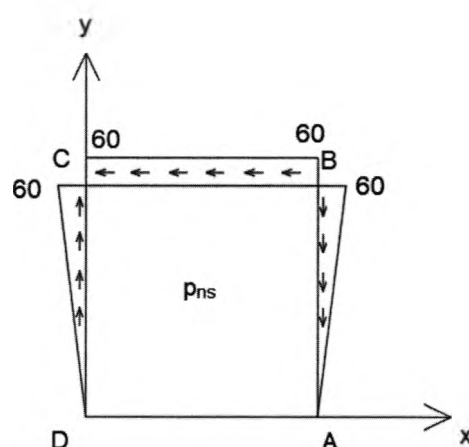B(5,5) C(0,5)

$n_x = 0$
$n_y = 1$
$p_{nn} = \sigma_y = 36x$
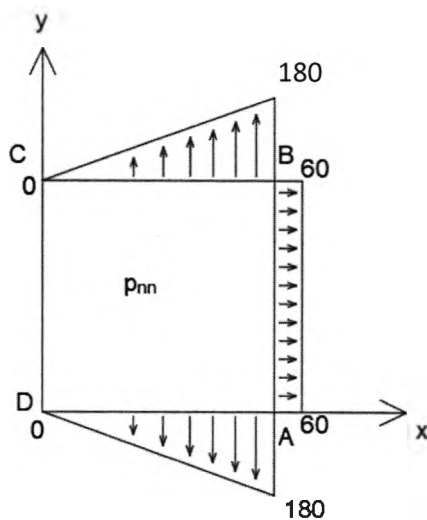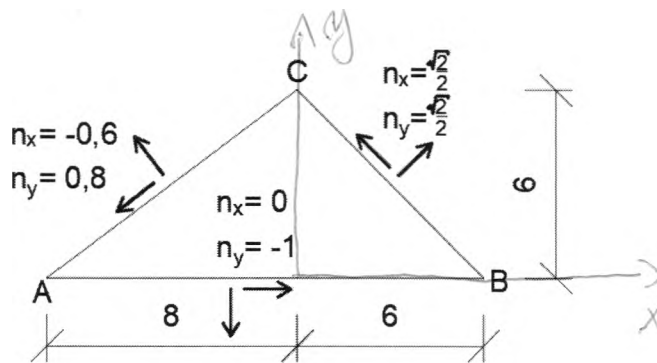
DA:
D(0,0) A(5,0)

$n_x = 0$
$n_y = -1$
$p_{nn} = \sigma_y = 36x$

. Wyznacz obciążenie tarczy

$$F(x,y) = 40x^3 + 20xy^2$$

$$\sigma_x = \frac{\partial^2 F}{\partial^2 y^2} = 40x$$

$$\sigma_y = \frac{\partial^2 F}{\partial^2 x^2} = 240x$$

$$\tau_{xy} = -\frac{\partial^2 F}{\partial x \partial y} = -40y$$

$$T_\sigma = \begin{bmatrix} 40x & -40y & 0 \\ -40y & 240x & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$p_{nn} = \sigma_x n_x^2 + 2\tau_{xy}n_x n_y + \sigma_y n_y^2$$

$$p_{ns} = (\sigma_y - \sigma_x)n_x n_y + \tau_{xy}(n_x^2 - n_y^2)$$

(AB)

$$p_{nn} = \sigma_y = 240x \rightarrow \begin{smallmatrix} A=-1920 \\ B=1440 \end{smallmatrix}$$

$$p_{ns} = n_y^2 \cdot \tau_{xy} = 40y \rightarrow \begin{smallmatrix} A=0 \\ B=0 \end{smallmatrix}$$

(BC)

$$p_{nn} = 40x \cdot 0,5 + 80y \cdot 0,5 + 240x \cdot 0,5 = 140x - 40y \rightarrow \begin{smallmatrix} B=840 \\ C=0 \end{smallmatrix}$$

$$p_{ns} = (240x - 40x) \cdot 0,5 = 100x \rightarrow \begin{smallmatrix} B=600 \\ C=0 \end{smallmatrix}$$

(AC)

$$p_{nn} = 168x + 38,4y \rightarrow \begin{smallmatrix} A=-1344 \\ C=230,4 \end{smallmatrix}$$

$$p_{ns} = -96x + 11,2y \rightarrow \begin{smallmatrix} A=768 \\ C=67,2 \end{smallmatrix}$$