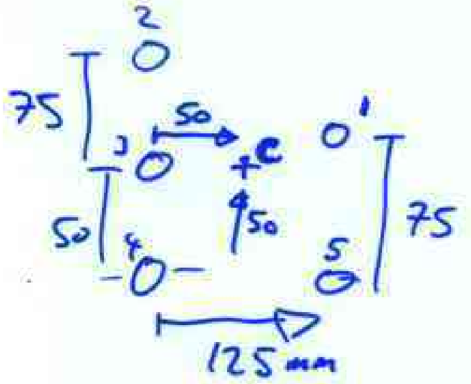
Michael Conry 2005 mconry@acronymchile.com

Area of a rivet $\quad 12\,mm\ \phi \Rightarrow \pi 6^2 = 113\ mm^2$

$\frac{\sum A_i x_i}{\sum A_i}$ $\quad A_i$ same for every rivet $\Rightarrow \frac{A_i \sum x_i}{\sum A_i} = \frac{\cancel{113}\sum x_i}{(5)(\cancel{113})}$

$$\frac{0+0+0+125+125}{5} = 50\,mm$$



$$\frac{\sum A_i y_i}{\sum A_i} = \frac{\sum y_i}{5} = \frac{0+0+50+125+75}{5} = 50\,mm$$

$\rho_1 = \sqrt{75^2+25^2} = 79.1$

$\rho_2 = \sqrt{75^2+50^2} = 90.1 \leftarrow F_2$

$\rho_3 = 50 = 50.0$

$\rho_4 = \sqrt{50^2+50^2} = 70.7$

$\rho_5 = \sqrt{\underbrace{\cancel{25^2}}_{50^2} + 75^2} = 90.1 \leftarrow F_5$

$\sum M_o = \rho_1 F_1 + \rho_2 F_2 + \rho_3 F_3 + \rho_4 F_4 + \rho_5 F_5 \leftarrow$ sum of moments.

Force $\propto \delta$; we assume $\delta_i \propto \rho_i$ Because areas are are all the same.

$\frac{F_1}{\rho_1} = \frac{F_2}{\rho_2} = \frac{F_3}{\rho_3} = \frac{F_4}{\rho_4} = \frac{F_5}{\rho_5}$ $\quad$ Can express $F_1\ F_2\ F_3\ F_4$ in terms of F_5 + geometry

$$\underbrace{F_1 = \frac{\rho_1 F_5}{\rho_5} \quad F_2 = \frac{\rho_2 F_5}{\rho_5} \quad \text{etc.}}_{\text{Substitute into } \sum M_o} \qquad F_5 = \frac{\rho_5 F_5}{\rho_5}$$