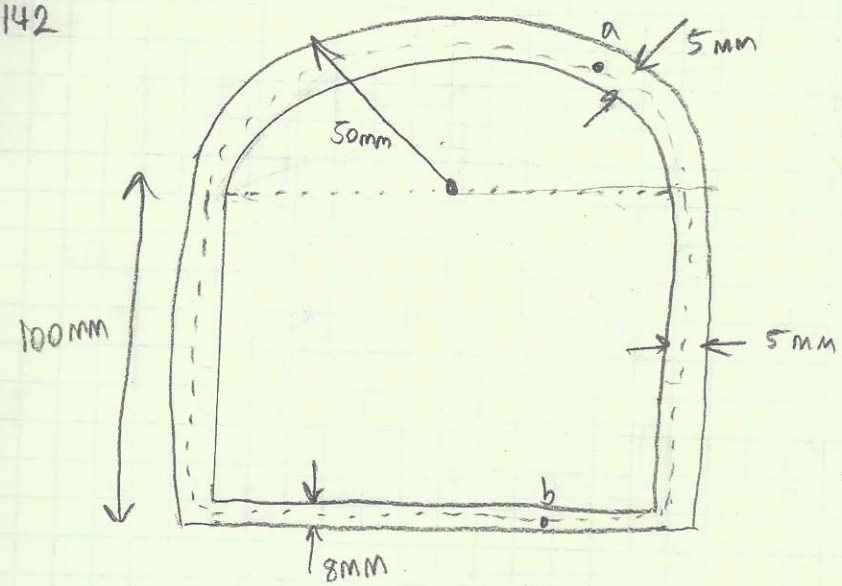
3.142



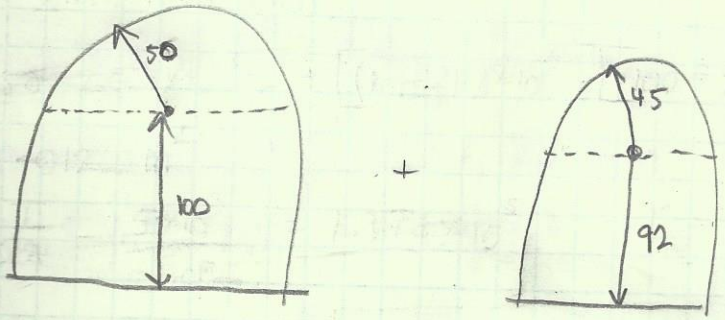
$M = 5.6 \times 10^3 \text{ N·m}$

$\tau_a = ?$ $\tau_b = ?$

$T = 2Aq$

$\tau = \frac{q}{t}$

$\tau = \frac{M}{2tA}$



$\frac{1}{2}\pi(50\times10^{-3})^2 + (100\times10^{-3})(100\times10^{-3})$

$= 1.39\times10^{-2}\ m^2$

$\frac{1}{2}\pi(45\times10^{-3})^2 + (90\times10^{-3})(92\times10^{-3})$

$= 1.15\times10^{-2}\ m^2$

$\bar{A} = \frac{1.39\times10^{-2} + 1.15\times10^{-2}}{2} = 1.27\times10^{-2}\ m^2$

$\tau_a = \frac{5.6\times10^3 \text{ N·m}}{2(5\times10^{-3})(1.27\times10^{-2})} = \boxed{4.41\times10^7 \frac{N}{m^2}}$

$\tau_b = \frac{5.6\times10^3}{2(8\times10^{-3})(1.27\times10^{-2})} = \boxed{2.76\times10^7 \frac{N}{m^2}}$