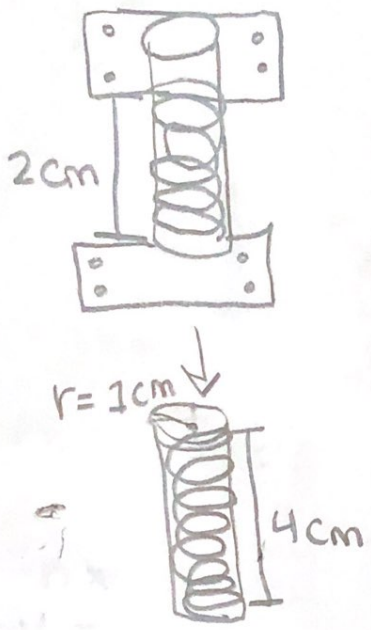


$F_S = -Kx$ Hooke's Law

$F/A = \sigma$ normal stress

F = 120N from door A = cross sectional area

F_S = 120N from door

K = ? (spring constant)

Δx = Final length of spring (expanded) - original length of spring

$F_S = -Kx$

$120N = -K(4-2)$

$-K = 60$

$K = -60$

$\sigma = F/A$

F = 120

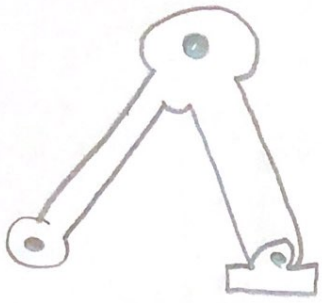
2cm = d

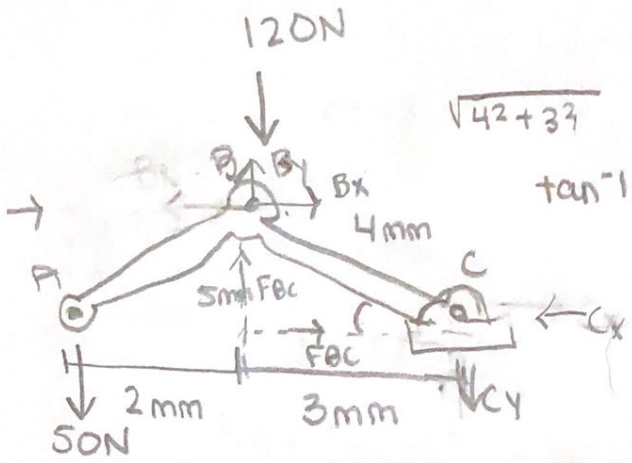
↓

20mm = d

$A = \frac{\pi}{4} d^2 \rightarrow \frac{\pi}{4}(20)^2 = 314.159\ mm^2$

$\sigma = \frac{120N}{314.159\ mm^2} = 0.3819mpa$





$\sqrt{4^2+3^2} = 5$

$\tan^{-1}(5/3) = 59.04°$

d of pin = 2mm

$\sigma = F/A$

$\sigma_{BC} = ?$

$\Sigma M_C = 0$

$= 50(5) + 120(3) - Bx(5)$

$Bx = 122\,N$

$\Sigma F_y = 0$

$= By - Cy - 120 - 50$

$170 = By - Cy$

$\Sigma M_B = 0$

$= -Cy(3) + 50(2)$

$Cy = 33.33N$

$By = 203.33N$

$\sqrt{122^2 + 203.33^2} = 237.12 = B$

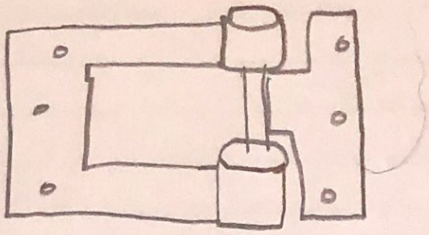
$\Sigma F_y = 0$

$= -120 + F_{BC}\sin(59.04)$

$F_{BC} = 139.94N$

$\sigma = \frac{F}{A} \rightarrow = \frac{139.94}{\pi/4(2)^2} = 44.54mpa$

$\sigma_{BC} = 44.54mpa$



$$\sigma = \frac{F}{A}$$

$d = 2mm$

$F = 120N$

$$A = \frac{\pi}{4}(2)^2 = 3.14$$

$$\sigma = \frac{120}{3.14} = 38.217 mpa$$