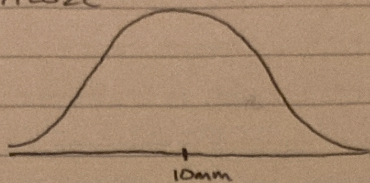


HW01 Due 9/27/2022

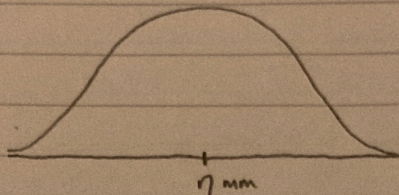
1) Aluminum Pins:



• mean = 10mm

• std. dev = 0.02mm

Aluminum Plates:



• mean = 7mm

• std. dev = 0.02

↳ Find  $\eta$  such that  $P(\text{randomly selected pin does not go through randomly selected hole}) = 0.01$

↳ Meaning  $P(\text{diameter of pins} > \eta) = 0.01$

↳ Use z score  $\rightarrow 1 - P\left(\frac{\eta - 10}{0.02}\right) = 0.01$

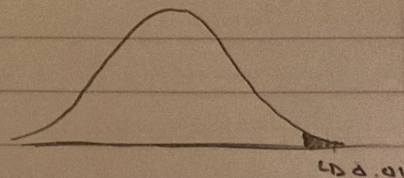
$$\rightarrow \frac{\eta - 10}{0.02} = \Phi^{-1}(0.99)$$

$$\eta - 10 = 0.02(2.32)$$

$$\eta = 10 + 0.0464$$

$$\boxed{\eta = 10.0464}$$

$$\frac{x - \mu}{\sigma} = \frac{\eta - 10}{0.02}$$



↳ Use cumulative normal distribution chart

2) a) Assuming that because individual strands must be normal, the cable is also normally distributed:

$$\text{mean} = \mu = 50 \cdot 451b = \boxed{22501b5}$$

$$\text{std. dev} = \sqrt{n\sigma^2} = \sqrt{50 \cdot (4)^2} = \sqrt{800} = \boxed{28.28}$$

b) Setting  $X$  as such cable:  $P(X < 2230) = P\left(Z < \frac{2230 - 2250}{28.28}\right) = P(Z < -0.707)$

$$= 1 - 0.7611$$

$$= \boxed{0.2398}$$

↳ Use cumulative normal dist cho