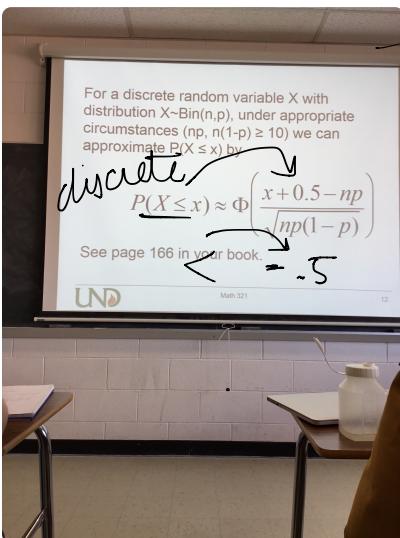


$$\begin{aligned} \textcircled{1} \text{ distribution? } \\ & X \sim \text{Binomial}(120, 1/6) \sim N(20, 10/6) \\ \textcircled{2} \quad E(X) &= np = 120(1/6) = 20 \\ V(X) &= np(1-p) = 120(1/6)(5/6) = 100/6 \\ \sigma_X &= \sqrt{100/6} = \frac{10}{\sqrt{6}} \quad \text{etc} \\ \textcircled{3} \quad 1 - P(X \leq 25) &= 1 - P(X \leq 24) = 1 - P(z \leq \frac{25-20}{\frac{10}{\sqrt{6}}}) \\ &\approx 1 - P(z \leq 1.2247) \\ & 1 - P(z \leq 1.2247) \\ &\quad \text{find in table} \\ & 1 - 0.8868 \\ & \sim 0.1112 \end{aligned}$$

Binomial?

- set trials
- trials independent
- success same prob each time
- fixed # of successes

how close is approximation

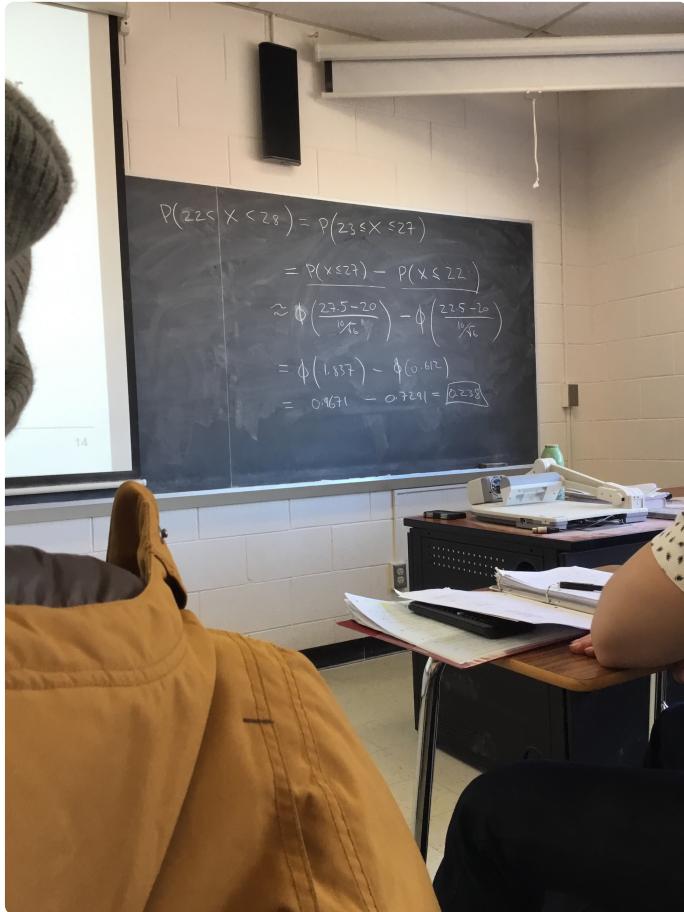
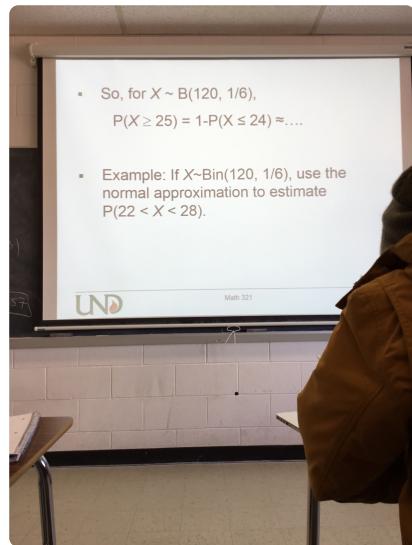


$$\begin{aligned} \xrightarrow{\text{z-score shifted up by .5}} \quad P(X \geq 25) &= 1 - P(X \leq 24) \\ &\approx 1 - P(z \leq \frac{24.5 - 20}{\frac{10}{\sqrt{6}}}) \\ &\sim 1 - P(z \leq 1.1023) \\ &1 - \Phi(1.1023) \\ &\quad \text{find in table} \\ &1 - 0.8643 = 0.1357 \end{aligned}$$

continuity correction factor

like equation

$$\begin{aligned}
 P(22 < X < 28) &= P(23 \leq X \leq 27) \\
 P(X \leq 27) - P(X \leq 22) &\quad \text{up in pm} \\
 \Phi\left(\frac{27.5 - 20}{10/\sqrt{6}}\right) - & \\
 \Phi\left(\frac{22.5 - 20}{10/\sqrt{6}}\right) & \\
 \Phi(-1.837) - \Phi(-0.612) & \\
 0.9671 - 0.7291 = & \boxed{(0.238)}
 \end{aligned}$$



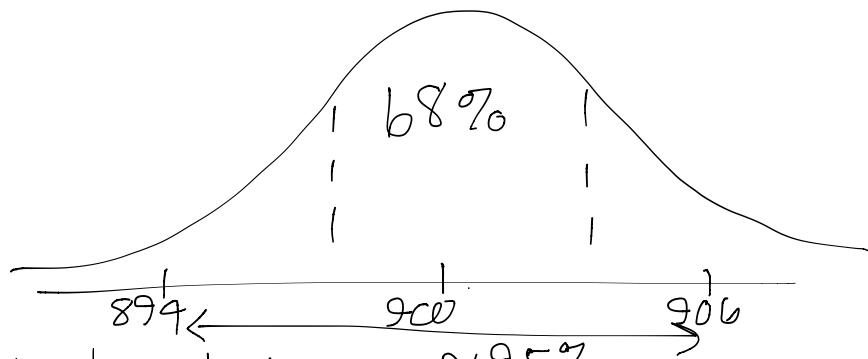
$X$  = comp. strength of bricks (PSI)

random variable  $X \sim N(900, 4)$

$$\mu = 900$$

$$V(X) = 4$$

$$\sigma = 2$$



Sample 20 random bricks  
 $x_1, x_2, \dots, x_{20}$

Suppose we were to sample 20 bricks

$$X_1, X_2, \dots, X_{19}, X_{20}$$

$$\bar{X} = \frac{X_1 + X_2 + \dots}{n}$$

\* trying to establish histogram

$\bar{X} = ?$  how close to 900?

if  $\bar{X} = 906.2$   
(doubtful  $\mu = 900$ )

