1. DIst of \( X \) = density of a casting.

\[ \sigma = 0.09 \text{ GIVEN} \]
\[ \mu = 1.77 \text{ GIVEN} \]

(\( \hat{\sigma} \) Rule)
\[ 3 \times 0.09 \]
\[ 1.0 \times 0.3413 \]
\[ \text{CLOSE TO 34}? \]

\% castings having density between these limits \[ \frac{0.68}{2} = 0.34 \]

Rule of Thumb
\[ 68\% \text{ in } \mu + \sigma \]
\[ 95\% \text{ in } \mu + 2\sigma \]
\[ \text{MORE ACCURATELY 1.96} \]
RECALL

\[ \sigma = 0.09 \]

1.77 = \mu

b. 68\% INTERVAL \[ \mu \pm \sigma = 1.77 - 0.09 \quad 1.77 + 0.09 \]

Low End High End.

Prob (Nasting density in above) \approx 0.68

c. 95\% INTERVAL \[ \mu \pm 2\sigma = 1.77 - 2(0.09) \quad 1.77 + 2(0.09) \]

Good for rough work.

d. AREA LEFT OF 1.77

E. Std (z) Score

Of Nasting whose density is \[ 1.8 = x \].

\[ z = \frac{x - \mu}{\sigma} = \frac{(1.8 - 1.77)}{0.09} = 0.33\frac{z}{ } \]
f. We refer to Table pg 210 to get $P(Z \in (0, 0.33))$

**Exactly same as** $P(X \in 1.77$ and $1.80)$

$$\frac{1.77 - \mu}{\sigma} = \frac{1.77 - 1.77}{0.09} = 0$$

$$\frac{1.80 - 1.77}{0.09} = 0.33$$

**Q2.5.** If instead of 1.77 we'd asked for

$P(X \in 1.6$ to $1.8)$

Need (lower) $z = \frac{1.60 - 1.77}{0.09} = -1.7$
SETUP

\[ Z = \begin{array}{c}
-1.88 \\
0 \\
0.33
\end{array} \]

ADD THESE TWO PIECES.

\[ Z \text{ (upper)} \]

\[ Z \text{ (lower)} \]

\[ Z = 1.03 \]

\[ Z = 0.3 \]

\[ 0.1293 \]

\[ \text{ANS (TO QUESTION RAISED IN CLASS)} \]

\[ P(\text{density } X \text{ in 1.6 to 1.8}) = 0.4699 + 0.1293 = 0.5992 \]
2. **Poisson**  
Given \( \lambda \) and must know that for Poisson, you know this!  
\[ \lambda = \sqrt{\mu} \]  
\text{Given } \mu = 12.6 \geq 10  
\begin{align*}  
b & \text{ 68\%} & 12.6 \pm \sqrt{12.6} & \text{Poisson + Rule}  
c & 95\% & 12.6 \pm 2 \sqrt{12.6} \end{align*}  
\text{d. } 3 \text{ for } X = 20  
\frac{20 - 12.6}{3.5} = 2.08  
\text{e. } 12.6 \text{ for } X = 20  
\frac{12.6}{20} = 0.63 \text{ Ans}
3. Binomial Distribution

\[ n \text{ # TRIALS (INDEF)} \]
\[ P \text{ PR OF "Success"} \]
\[ \sim \text{ NORMAL PROVIDED } mp = 10, m(1-p) \geq 10 \]

\[ P(\text{PART DEFECTIVE}) = 0.19 \]
\[ 1 - p = 0.81 \]
\[ p = 0.19 \]
\[ m = 200 \]

a.

\[ x = \# D \text{ IN } 200 \]
\[ \sqrt{mp(1-p)} = \approx \text{ INDEF} \]
\[ m = mp = 200(0.19) = 38 \]
\[ = \sqrt{200 \cdot 0.19 \cdot 0.81} = 5.55 \]

b. 68% 38 \pm 5.55 \text{ IF WISH TO KNOW } P(X \text{ IN } 32 \text{ TO } 42) \text{ BEST TO USE: } 31.5 \text{ TO } 42.5

c. 95% 38 \pm 2(5.55) \text{ IF USE Z APPROX
\[ \frac{50 - 38}{5.5} = 2 \quad \text{SCORE FOR } S_0 = X \]

\[ P(\text{MORE THAN } 50 \text{ D IN 200}) = P(\frac{Z}{\text{APPROX}}) \left(\frac{50 - 38}{5.5}\right) \]

\[ \sim 0.015 \]

\[ 2 \quad 0.06 \]

\[ 2.1 \quad 0.4846 \]

\[ 2.16 \quad 0.4846 \]