Section 7.5 - Confidence Intervals for a Population Mean $\mu$
(assuming $\sigma$ is known).

Steps:
1. Gather $\bar{x}$, $\sigma$, $n$, level of confidence; check $n \geq 30$, or pop. is normal.
2. $\alpha = 1 - \text{confidence level}$.
3. Look up $Z_{\alpha/2}$ on Table A1.
4. $E = Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$ (margin of error in $\bar{x}$).
5. Confidence interval

\[ \bar{x} - E < \mu < \bar{x} + E. \]

The proportion of such intervals that actually contain $\mu$ is the level of confidence.

Ex: From a sample of 55 men, the mean height is 68.3". The pop. std. dev. is 3". What is the 94\% confidence interval for the mean height of all men?

1. $\bar{x} = 68.3$, $\sigma = 3$, $n = 55$, $Z_{0.94} = 1.756$
2. $E = 1.756 \cdot \frac{3}{\sqrt{55}} \approx 0.76$
3. From Table A1, $Z_{0.08} = 1.88$
4. Max Error

\[ E = Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}} = 1.88 \cdot \frac{3}{\sqrt{55}} \approx 0.76 \]
5. Conf Int: $\bar{x} - E < \mu < \bar{x} + E$

68.3 - 0.76 < $\mu$ < 68.3 + 0.76
67.54" < $\mu$ < 69.06"