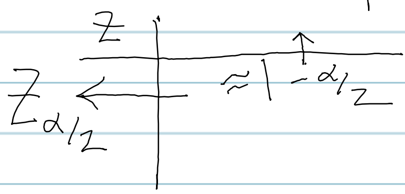
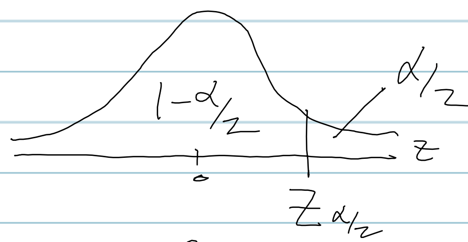
Section 7.5 → Confidence Intervals for a Population Mean, μ (pretending σ is known).

Steps:

1. Gather $\bar{x}$, σ, n, level of confidence. Check $n > 30$, or pop. is normal.
2. $\alpha = 1 -$ (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 μ is the level of confidence.

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

1. $\bar{x} = 68.3$, $\sigma = 3$, $n = 55 > 30$ ✓, conf $= 0.94$
2. $\alpha = 1 - 0.94 = 0.06$.
3. Table A1

.08

$1 - \alpha/2$

1.8 ← $\approx .97$

$\approx .9699$

$z_{\alpha/2} = 1.88$

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: $\bar{x} - E < \mu < \bar{x} + E$

$$68.3 - 0.76 < \mu < 68.3 + 0.76$$

$$67.54'' < \mu < 69.06''$$