7.4: Testing a claim about a mean: sigma known

Assumptions for Means, sigma known

1) SRS
2) Sigma known (σ known)
3) n > 30 or normally distributed

σ : population st. dev.

Can we use z for the following situation?

1. n = 35; sigma is known; population is not normally distributed

Yes; σ known
$n > 30$

Can we use z for the following situation?

2. n = 25; sigma is not known;
population is normally distributed

No σ unknown

Can we use z for the following situation?

3. n = 25; sigma is known; population is not normally distributed

No $n < 30$ not normal

Can we use z for the following situation?

4. n = 15; sigma is known; population is normally distributed

Yes; σ known
normal

Test statistic for means, sigma known

$$Z = \frac{(\bar{x} - \mu)}{(\sigma / \sqrt{n})}$$

$\bar{x}$: mean of sample

μ : mean of population

σ : population st. dev.

n : sample size

Conduct a 6 step hypothesis test

$\bar{x}$ = 120, n = 50, and σ = 12, test the claim that the mean IQ score of statistics professors is greater than 118. Use a .05 significance level. Use the p-value method

1. State H_0 & H_a; write a sentence for the claim $H_0: \mu = 118$ $H_a: \mu > 118$ claim: mean IQ score of stat. professors is greater than 118.	2. State the assumptions. SRS σ known $n \geq 30$ or normal	3. State when to reject null for p-value method. reject H_0 if pvalue $< .05$
4. Calculate the test statistic. $z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{(120-118)}{(12/\sqrt{50})}$ $= 1.179$	5. Sketch and find the p-value.. Determine whether to reject the null. Explain.  1.179 pvalue = ncdf(1.179, 888) = .119 Fail to reject .119 > .05	6. Conclusion *There is not sufficient evidence to support the claim that the mean IQ score for stat. professors is greater than 118.*

Conduct a 6-step hypothesis test

The mean body temperature of 106 peole was 98.2°F. Assume that $\sigma = 0.62$. Use a .01 significance level to test the claim that the common belief that the mean body tepeature is 98.6°F. Use the traditional method.

1. State H_0 & H_a; write a sentence for the claim	2. State the assumptions.	3. Sketch bell curve. Determine the critical value. State when to reject null.
$H_0: \mu = 98.6°F$ $H_a: \mu \neq 98.6°F$ claim: mean body temp. is 98.6°F.	SRS σ known $n > 30$ or normal	 invnorm(.01/2) = ±2.57 reject H_0 if Z is in the critical region
4. Calculate the test statistic.	**5.** Determine whether to reject the null. Explain.	**6.** Conclusion
$Z = \frac{(98.2 - 98.6)}{(.62/\sqrt{106})}$ $= -6.642$	reject null; $Z = -6.642$ is in the critical region.	*There is sufficient evidence to warrant rejection of the claim that the mean body temperature is 98.6.*