Starter 3/10

What is the Normal Condition when working with Means?

p. 564 #57-60

9.2a Performing Significance Tests

(4 Step Process)

① **State**: Hypotheses (H_0, H_a), define the parameter (p, μ), give α (significance level)

use 0.05 if not given.

② **Plan**: Identify method, check conditions

Method (for proportions): called a 1-Sample z Test for a proportion

(for means): 1-Sample T Test for a mean

Conditions: 1. Random

2. Normal

proportions: $n(p) \geq 10$, $n(1-p) \geq 10$

means: $n \geq 30$ or data have no outliers or strong skewness

3. Independent - 10% rule

③ **Do**: Calculate Test Statistic & P-value

$$\text{test statistic} = \frac{\text{statistic} - \text{parameter}}{\text{st. dev. of statistic}}$$

for proportions: $z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$

for means: $t = \dfrac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$

$H_a: p <$ $H_a: p >$ $H_a: p \neq$

use Normalcdf (min, max)

tcdf(min, max, df)

$df = n-1$

on calc: for proportions: $\boxed{\text{Stat}}$ → Tests → 5: 1-prop ZTest

for means: 2: T-Test

④ **Conclude**: Compare p-val with α

Conclude reject or fail to reject H_0

Context

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a) ① $H_0: \mu = 25$ μ is the true mean speed of drivers in this construction zone.

$H_a: \mu > 25$

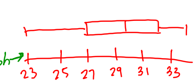
$\alpha = 0.01$

② Perform a 1-Sample T test for a mean

Conditions: 1. Random - random sample of 10 drivers.

2. Normal - $n = 10 < 30$

No outliers or strong skewness on graph

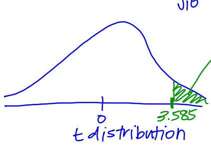


3. Independent - Assume that more than 100 drivers drive in this construction zone.

③ $t = \dfrac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}} = \dfrac{29-25}{\frac{3.528}{\sqrt{10}}} = 3.585$

tcdf(min, max, df) = .003 ← p-value

(3.585, ∞, 9)



on calc: $\bar{x} = 29$
$s = 3.528$
$t = 3.585$
p-val = 0.003
df = 9

④ Since our p-value (.003) is less than our α (.01), we will reject the Null Hypothesis. We can conclude that that the true average speed of drivers in this zone is greater than 25mph.