Week 5 application solutions

1. σ-Known

$\sigma = 0.18$
$\bar{x} = 2.92$
$\alpha = 0.01$

a. $H_0: \mu \geq 3$ lbs
$H_a: \mu < 3$ lbs

↓ this is a left-tailed test because we are here to 'research' if our machine is not filling correctly

Test statistic:

$$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} = \frac{2.92 - 3}{0.18/\sqrt{36}} = -2.67$$

Critical value @ 99% for one-tailed test = −2.33

Reject H_0 @ 99% confidence.
We found statistical evidence to reject the claim that the machine is working correctly. Consumer rights may not be protected

p-value method

$0.0038 \leq 0.01 \rightarrow$ Reject H_0.

2. σ-unknown

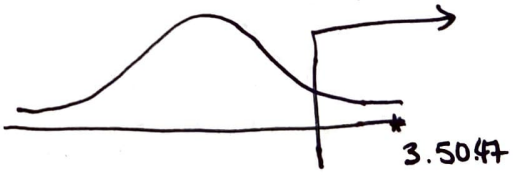
$H_0: \mu \leq 24$
$H_a: \mu > 24$

Test-statistic

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

Degrees of Freedom
34

$$t = \frac{26.5 - 24}{4.22/\sqrt{35}} = 3.5047$$



1.69
↓
using
t.inv(0.05,34)

Reject H_0 at 95% confidence. We found evidence to support that teenagers spend more than 24 hours on instagram a week.

t.dist.rt (3.5047, 34) ← p-value
$0.000652 \leq 0.05$