SOLUTIONS
TAKE HOME ASSIGNMENT #1
922-DW
INTRO TO STATS FALL 2015

1- $\mu = 500$
$\sigma = 30$
$n = 36$

a. $\mu_{\bar{x}} = \mu = \underline{500}$

b. $\sigma_{\bar{x}} = \sigma/\sqrt{n} = 30/\sqrt{36} = \underline{5}$

c. NORMAL DISTRIBUTION because $n > 30$

2- $\mu = 47858$
$\sigma = 7750$
$n = 100$

so $\sigma_{\bar{x}} = 7750/\sqrt{100} = 775$

$\bar{x}$ have Normal distribution $N(\bar{x}; 47858, 775)$

a. $P(\bar{x} < 45000)$

$= P\left(z < \frac{45000 - 47858}{775}\right) = P(z < -3.69) = \underline{0.0001}$

b. $P(46000 < \bar{x} < 48000)$

$= P\left(\frac{46000 - 47858}{775} < z < \frac{48000 - 47858}{775}\right)$

$= P(-2.39 < z < 0.18)$

$= 0.5714 - 0.0084$

$= \underline{0.5630}$

C. $P(\bar{x} > 50,000)$

$= P(z > 2.76)$

$= 1 - 0.9971$

$= \underline{0.0029}$

[QUESTION 3]

A. $H_0: \mu = 56$ oz.

$H_a: \mu \neq 56$ oz.

B. $H_0: \mu = 18$ yrs $(\geq)$

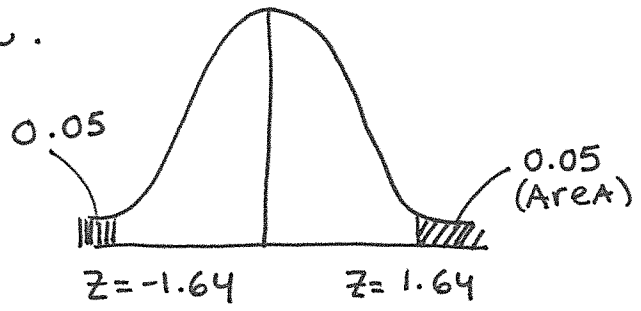
$H_a: \mu < 18$ yrs

C. $H_0: \mu = 400\$$ $(\leq)$

$H_a: \mu > 400\$$

[QUESTION 4]

a.



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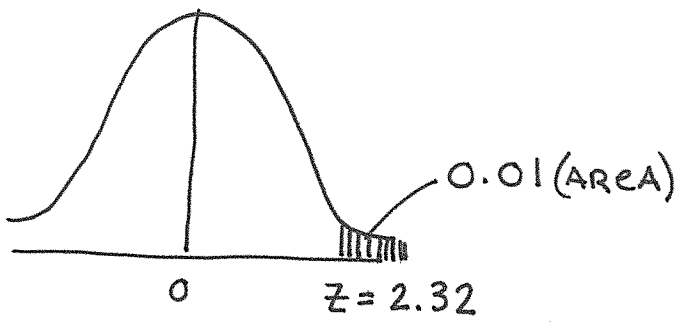

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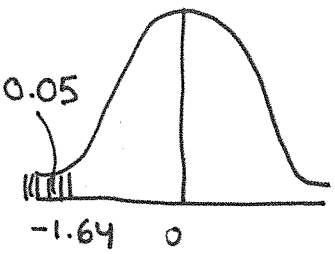

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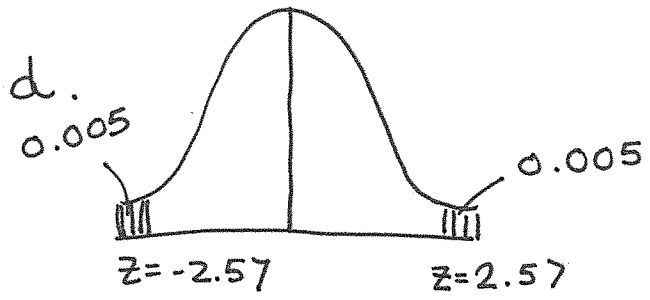


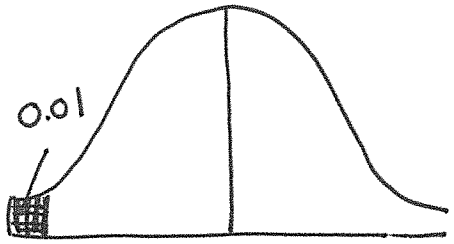
[QUESTION 5]

* NOTE THAT SINCE THERE IS NO MENTION THAT THE ORIGINAL POPULATION IS NORMAL & $n < 30$ WE CANNOT ACCURATELY CONDUCT TEST

$n = 31$
$\bar{X} = 19.4$
$S = 9.6$
$\alpha = 0.01$

t-table σ UNKNOWN

$H_0: \mu = 25 \quad (\geq)$
$H_a: \mu < 25$



$t = -2.457$

TEST STATISTIC

$$t = \frac{19.4 - 25}{9.6/\sqrt{31}} = -3.26$$

$df = 31 - 1 = 30$
t value with 0.01

We Reject H_0 therefore the student's claim is rejected, students do not travel at least 25 mins on average one way to reach the college.

[QUESTION 6]

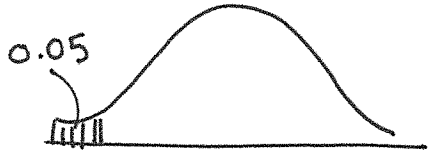
$n = 24$
$\bar{X} = 5428/24 = 226.17$
$S = 48$
population normal
$\alpha = 0.05$

TEST STATISTIC

$$t = \frac{226.17 - 250}{48/\sqrt{24}} = -2.43$$

. Since σ IS UNKNOWN BUT pop. IS Normal, we can use t-test

$H_0: \mu = 250 \quad (\geq)$
$H_a: \mu < 250$



$t = -1.714$ $df = 23$

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Since our test statistic $t = -2.43$ is in the critical region we reject H_0 Therefore there is enough evidence to conclude that the mean is less than 250 Mg/day.

[QUESTION 7]

$$\bar{x} = \frac{173 + 178 + 145 + 146 + \cdots + 131}{16} =$$

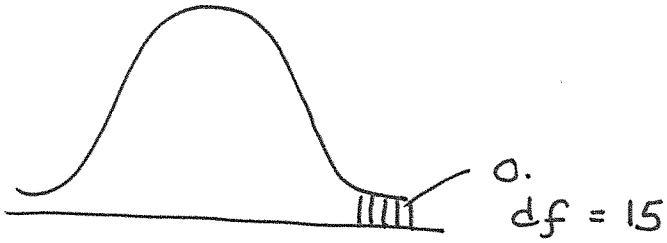
$$= 160.25$$

$$S^2 = \frac{1}{n-1} \sum (x - \bar{x})^2$$

$$= \frac{1}{15} \left[(173 - 160.25)^2 + \cdots + (131 - 160.25)^2 \right]$$

$$= 341.51$$

$$S = \sqrt{341.51} = 18.48$$



$H_0: \mu = 160$ (=)

$H_A: \mu > 160$

We can use t-test b/c σ is unknow & population is normal

$$t\text{- statistic} = \frac{160.25 - 160}{18.49/\sqrt{16}}$$

$$= 0.054$$

The H_0 is accepted, the mean weight of adult males equals 160 lb or less

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3 - IMMOBI

[QUESTION 8]

$H_0: \mu = 4.7 \quad (\geq)$

$H_A: \mu < 4.7$

$n = 64$

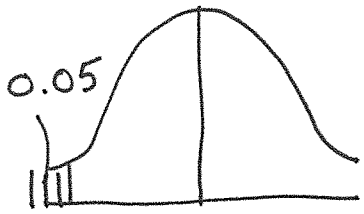
$\bar{x} = 4.4$

$S = 2.4$

Since σ is UNKNOWN
WE USE t-TEST
$df = 63$

$\alpha = 0.05$

(THE TABLE HAS
t-value FOR
$df = 60$)



$t = -1.671$

t-STATISTIC: $t = \frac{4.4 - 4.7}{2.4/\sqrt{64}} = -1.0$

* NOTE THAT
SINCE $n > 30$
USE OF Z-value
INSTEAD OF t-value
IS ACCEPTABLE

H_0 IS ACCEPTED
THE RATES WILL NOT BE DECREASED