STAT345: Homework 8

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Problem 1

a

$Z = \frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}}$
$Z = \frac{19.8889-20}{0.75/\sqrt{10}}$
$Z = -0.4684387308$
$p - value = 1 - 0.68439$
$p - value = 0.31561$
I do not reject the null hypothesis.

b

$Z = \frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}}$
$Z = \frac{19.8889-20}{0.75/\sqrt{10}}$
$Z = -0.4684387308$
$p - value = 2(1 - 0.68439)$
$p - value = 0.63122$
I still do not reject the null hypothesis.

Problem 2

a

$\bar{x} = 98.224$
$s = 0.5577335$
$t_{n-1,\frac{\alpha}{2}} = 2.064$
$t_0 = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$
$t_0 = \frac{98.224-98.6}{0.5577335/5}$

$t_0 = -3.3707855096$
The null hypothesis is incorrect. $\mu_0 \neq 98.6$.

b

$\bar{x} = 98.224$
$s = 0.5577335$
$t_{n-1,\frac{\alpha}{2}} = 2.064$
$t_0 = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$
$t_0 = \frac{98.224-98.6}{0.5577335/5}$
$t_0 = -3.3707855096$
The null hypothesis is incorrect. $\mu_0 < 98.6$.

Problem 3

a

$\mu = 1.5$ $\bar{x} = 1.4975$ $\sigma = 0.01$ $Z = -1.25$
The diameter is not less that 1.5.

b

$p - value = 1 - \phi(z)$ $p - value = 1 - 0.06681$ $p - value = 0.93319$

Problem 4

$\hat{p} = 0.6$ $p_0 = 0.5$ $z_0 = \frac{\hat{p}-p_0}{\sqrt{p_0(1-p_0)/n}}$ $z_0 = \frac{0.6-0.5}{\sqrt{0.5(1-0.5)/500}}$ $z_0 = 4.472135956$ Yes more than half of the voters support term limits for politicians.