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Spring 2021

Math 560 Homework (#7, Inference of the Mean)

Problem 1. Given $\bar{x} = 9.289221, s = 0.8191156$ and $n = 10$ calculate the 92% two-sided C.I. for μ.

Solution.

- t^*, a statistic that follows a **t-distribution**, $t(n-1=7)$ for $C = 92\%$, is given by

```
qt(0.96, df=7)
>> 2.046011
```

- Hence the 92% confidence interval for μ is:

$$\begin{aligned} &= \bar{x} \pm t^* \frac{s}{\sqrt{n}} \\ &= 9.289221 \pm 2.046011(\frac{0.8191156}{\sqrt{8}}) \\ &= (8.696694, 9.881748) \end{aligned}$$

□

Problem 2. StatsVillage.txt is used.

Solution. (a) The following seed is used

```
set.seed(19891)
```

(b) Here are the summary statistics for two independent SRSs

Population	Name	n	$\bar{x}$	s
1	North	15	3474.8	7828.715
2	South	20	7319.15	5318.922

1. Test $H_0 : (\mu_1 - \mu_2) = 0$ vs. $H_a : (\mu_1 - \mu_2) < 0$

2. Test statistic:

$$\begin{aligned} t &= \frac{(\bar{x_1} - \bar{x_2}) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \\ &= \frac{(3474.8 - 7319.15) - 0}{\sqrt{\frac{7828.715^2}{15} + \frac{5318.922^2}{20}}} \\ &= -1.639167 \end{aligned}$$

□