fs-termtest-C-solutions-v2

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1 MATH 2441 Term Test C Solutions (Version 2)

Question 1 $n = 502, x = 451, 1 - \alpha = 0.95$

$$E = z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}\hat{q}}{n}} = 1.96\sqrt{\frac{\frac{451}{502}\frac{51}{502}}{502}}$$

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In [1]: E<-1.96*(((451/502)*(51/502))/502)^.5

In [2]: E

In [3]: lr<-(451/502)-E

In [4]: hr<-(451/502)+E

In [5]: interval<-c(lr,hr)

In [7]: interval
```

Question 2 $\sigma^2 = 8100, n = 36, s^2 = 11256, 1 - \alpha = 0.95$

$$\chi^2 = \frac{(n-1)s^2}{\sigma^2} = \frac{35 \cdot 11256}{8100}$$

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In [8]: cs<-(35*11256)/8100

In [9]: cs

In [10]: crit<-c((16.791+24.433)/2,(46.979+59.342)/2)

In [11]: crit
```

Decision: fail to reject H_0.

Question 3 $p^* = 0.18, E = 0.04, 1 - \alpha = 0.99$

$$n = \frac{(z_{\frac{\alpha}{2}})^2 p^*(1-p^*)}{E^2}$$

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In [12]: n<-(2.575^2*0.18*(1-0.18))/(0.04^2)

In [13]: n
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Question 4 $\mu = 351, n = 800, \bar{x} = 360, s = 94, 1 - \alpha = 0.95$

$$t^* = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$

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In [14]: ts<-(360-351)/(94/(800^.5))
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In [15]: ts
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$$t_\alpha = 2.646$$

Decision: reject H_0.

Question 5 $\sigma = 0.008, n = 50, \bar{x} = 0.086, 1 - \alpha = 0.90$

$$E = z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

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In [16]: E<-1.645*(0.008/(50^.5))
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In [17]: E
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In [18]: confint<-c(0.086-E,0.086+E)
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In [19]: confint
```

The confidence interval is between 8.41% and 8.79%.