# Lab 7, Group 5, 2018/11/21

Q1 Variance $\sigma^2$=45 , $\bar{x}$ =22, n=10 95%→2.5%~ 97.5%→1.96

$$\frac{\rho}{\sqrt{n}} = \frac{\sqrt{45}}{\sqrt{10}} = \frac{3}{\sqrt{2}}$$

$$(C1,C2)=(22-1.96\times\frac{3}{\sqrt{2}},\ 22+1.96\times\frac{3}{\sqrt{2}})$$

$$=(17.842,\ 26.158)$$

Q2

$$\sigma = 3.5mg/dl, \bar{x} = 5.98mg/dl, n = 16$$

90%→95%→1.645; 99%→99.5%→2.576;

(1) (C1,C2) for 90% is (5.98-1.645*3.5/4, 5.98+1.645*3.5/4) = (4.54, 7.42)

(2) (C1,C2) for 95% is (5.98-1.96*3.5/4, 5.98+1.96*3.5/4) = (4.265, 7.695)

(3) (C1,C2) for 99% is (5.98-2.576*3.5/4, 5.98+2.576*3.5/4) = (3.726,8.234)

Q3

Make the hypothesis

H0 W is not better (< 0.33)

H1 W is better (> 0.33)

$\bar{x}$ = 0.4, u = 0.33, 1/3 =0.33, 2/5=0.4, For Binomial Distribution we have

$S^2$ = Dx = p[ (1-p) ^2]+(1-p)[(0-p)^2]

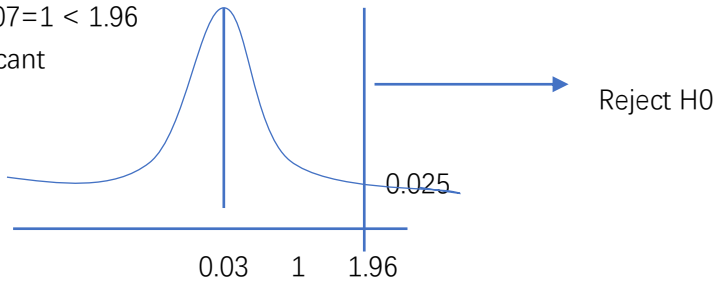
=p(1-p)[p+(1-p)]

=p(1-p)

$$Z = \frac{X-u}{S/\sqrt{n}}$$ = (0.4-0.33)/$\sqrt{0.33*(1-0.33)}*\sqrt{\frac{1}{45}}$

=0.07/0.07=1 < 1.96

not significant




Thus we cannot be 90% sure that West Chester is better, then use confidence interval

$$0.4\pm1.645\sqrt{0.4*(1-0.4)}/\sqrt{45}$$

$$=0.4\pm1.645*0.073$$

=0.4±0.12 -> (0.28,0.52) overlaps 0.33

**We can be 90% sure now that West Chester's past rate falls down in a minimum of 0.28 which is smaller than 0.33 and a maximum of 0.52 which is greater then 0.33, so we cannot ensure WC is better than average.**

Group member list with responsibility.：

| Name | Student Number | Responsibility | Contribution Percentage |
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