Họ và tên SV: Nguyễn Hải Đăng   Tên học phần: Xác suất thống kê
Mã số SV: 20120049   Mã học phần: MTH00040
Ngày thi: Giờ thi   Số trang/Tổng số trang: /

8.15:

$\bar{x} = 485,35$; $S_x^2 = 8161,084$; $n = 20$; $S_x = 90,339$

KTC 95% =) $\alpha = 0,05$ =) $\varepsilon = t_{\alpha/2, n-1} \cdot \dfrac{S}{\sqrt{n}} = 2,093 \cdot \dfrac{90,339}{\sqrt{20}} \approx 42,279$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ (=) $443,926 \leq \mu \leq 528,034$

8.16

$\bar{x} = 231,8068$; $S = 1,531$; $n = 5$

KTC 90% =) $\alpha = 0,1$ =) $\varepsilon = t_{\alpha/2, n-1} \cdot \dfrac{S}{\sqrt{n}} = 2,132 \cdot \dfrac{1,531}{\sqrt{5}} = 1,4598$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ (=) $230,2103 \leq \mu \leq 233,1293$

8.17

$\bar{x} = 317,2$; $S = 15,2$; $n = 10$

KTC 99% =) $\alpha = 0,01$ =) $\varepsilon = t_{\alpha/2, n-1} \cdot \dfrac{S}{\sqrt{n}} = 3,25 \cdot \dfrac{15,2}{\sqrt{10}} = 16,136$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ (=) $301,064 \leq \mu \leq 333,336$

8.18

$\bar{x} = 2,9$; $S = 0,1$; $n = 12$

KTC 99% =) $\alpha = 0,01$ =) $\varepsilon = t_{\alpha/2, n-1} \cdot \dfrac{S}{\sqrt{n}} = 3,106 \cdot \dfrac{0,1}{\sqrt{12}} = 0,09$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ (=) $2,81 \leq \mu \leq 2,99$

8.20

a. $\bar{x} = 156,28$; $S^2 = 37,68$; $S = 6,14$

b. Độ tin cậy $0,95$ =) $\alpha = 0,05$ =) $t_{0,025; 26} = 2,045$ =) $\varepsilon = 2,056 \cdot \dfrac{6,14}{\sqrt{27}} = 2,429$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ (=) $153,908 \leq \mu \leq 158,629$; $\dfrac{(n-1)S^2}{\chi^2_{0,025; 26}} \leq \sigma^2 \leq \dfrac{(n-1)S^2}{\chi^2_{0,975; 26}}$

(=) $23,37 \leq \sigma^2 \leq 20,29$

8.21

$\bar{x} = 225,854$; $S = 13,259$; $n = 82$

a. Độ tin cậy $0,95$ =) $\alpha = 0,05$ =) $\varepsilon = t_{0,025; 81} \cdot \dfrac{S}{\sqrt{n}} = 1,99 \cdot \dfrac{13,259}{\sqrt{82}} = 2,914$

$\bar{x} - \varepsilon \leq \mu \leq \bar{x} + \varepsilon$ =) $222,94 \leq \mu \leq 228,77$

② Độ tin cậy 0,99 ⟹ α = 0,01 ⟹ ε = $t_{0,005;81} \cdot \frac{s}{\sqrt{n}}$ = 2,638 . $\frac{13,259}{\sqrt{82}}$ ≈ 8,863

$\bar{x} - ε ≤ μ ≤ \bar{x} + ε$ ⟹ 122,191 ≤ μ ≤ 222,217.

b. $ε = z_{1-α/2} \cdot \frac{s}{\sqrt{n}}$ = 2,576 . $\frac{13,259}{\sqrt{82}}$ ≈ 3,772.

$x = \left(z_{1-α/2} \cdot \frac{s}{ε} \right)^2 = \left(2,576 . \frac{13,259}{8,007} \right)^2$ ≈ 292.

8.22

a. $\bar{x} = 132,83$; $s^2 = 19,42$; $s = 4,41$

b. α = 0,05 và n = 12; $ε = t_{0,025;11} \cdot \frac{s}{\sqrt{12}}$ = 2,201 . $\frac{4,41}{\sqrt{12}}$ = 2,802

$\bar{x} - ε ≤ μ ≤ \bar{x} + ε$ ⟹ 135,028 ≤ μ ≤ 140,63.

$\frac{(n-1)s^2}{x^2_{0,025;11}} ≤ σ^2 ≤ \frac{(n-1)s^2}{x^2_{0,935;11}}$ ⟹ $\frac{11 \cdot 4,41^2}{21,92} ≤ σ^2 ≤ \frac{11 \cdot 4,41^2}{3,82}$ ⟹ 9,26 ≤ σ^2 ≤ 56

8.23

a. $\bar{x} = 1391,41$; $s^2 = 234,45$

b. α = 0,05; n = 128; $ε = t_{0,025;127} \cdot \frac{s}{\sqrt{n}}$ = 1,96 $\frac{234,45}{\sqrt{128}}$ = 40,616

⟹ 1350,29 ≤ μ ≤ 1432,026.

c. $x = \left(z_{0,935} \cdot \frac{s}{E} \right)^2 = \left(1,96 . \frac{234,45}{30} \right)^2$ = 235,62

8.27

α = 0,05; n = 10; s = 4,8.

$ε = t_{0,025;9} \cdot \frac{4,8}{\sqrt{10}}$ = 19,02 $\frac{4,8}{\sqrt{10}}$ = 288 ≈ 20,3

$\frac{(10-1) \cdot 4,8^2}{x^2_{0,025;9}} = \frac{(10-1) \cdot 4,8^2}{19,02} ≤ σ^2 ≤ \frac{(10-1) \cdot 4,8^2}{2,8}$ ⟹ 10,9 ≤ σ^2 ≤ 26,8

⟹ 3,3 ≤ σ ≤ 8,26.

8.28

α = 0,05; $s^2 = 0,896$; n = 8

$\frac{(n-1)s^2}{x^2_{0,025;8}} ≤ σ^2 ≤ \frac{(n-1)s^2}{x^2_{0,935;8}}$ ⟹ $\frac{7 \cdot 0,896^2}{16,01} ≤ σ^2 ≤ \frac{7 \cdot 0,896^2}{1,69}$

⟹ 0,35 ≤ σ^2 ≤ 3,33 ⟹ 0,59 ≤ σ ≤ 1,825

8.29

α = 0,05; $\hat{p} = \frac{13}{300}$ = 0,043; $s = \sqrt{300 \cdot 0,043 (1 - 0,043)}$ = 3,514

$\hat{p} - z_{1-α/2} \frac{s}{\sqrt{n}} ≤ p ≤ \hat{p} + z_{1-α/2} \cdot \frac{s}{\sqrt{n}}$

$0,043 - 1,96 \frac{3,514}{\sqrt{300}} ≤ p ≤ 0,043 + 1,96 \cdot \frac{3,514}{\sqrt{300}}$

0,02 ≤ p ≤ 0,066

8.30 $\alpha = 0,05$

$f = \dfrac{412}{768} = 0,5365$; $S = \sqrt{768 \cdot 0,5365(1-0,5365)} = 13,82$

$0,5365 - z_{0,975} \dfrac{13,82}{768} \leq p \leq 0,5365 + z_{0,975} \dfrac{13,82}{768} \Rightarrow$

$(\Rightarrow)$ $0,501 \leq p \leq 0,522$

8.31 $\alpha = 0,05$; $z_{0,975} = 1,96$

$f = \dfrac{823}{1000} = 0,823$; $S = \sqrt{1000 \cdot 0,823(1-0,823)} = 12,069$

a. $0,823 - z_{0,975} \dfrac{12,069}{1000} \leq p \leq 0,823 + z_{0,975} \dfrac{12,069}{1000}$

$(\Rightarrow)$ $0,799 \leq p \leq 0,842$

b. Theo đề bài $z_{0,975} \cdot \dfrac{S'}{n} = 0,03$

$(\Rightarrow) 1,96 \cdot \dfrac{\sqrt{1000 \cdot \frac{x}{1000}\left(1-\frac{x}{1000}\right)}}{1000} = 0,03$

b. $x = \left(z_{1-\alpha/2} + \dfrac{S}{E} \right)^2 f(1-f)$

$= \left(\dfrac{1,96}{0,03} \right)^2 0,823(1-0,823) = 622$

8.32 $\alpha = 0,05$, $z_{0,975} = 1,96$

$f = \dfrac{40}{50} = 0,8$; $S = \sqrt{50 \cdot 0,8(1-0,8)} = 2\sqrt{2}$

a. $0,8 - z_{0,975} \dfrac{S}{n} \leq p \leq 0,8 + z_{0,975} \dfrac{S}{n}$ $(\alpha = 0,05)$

$(\Rightarrow) 0,8 - 1,96 \dfrac{2\sqrt{2}}{50} \leq p \leq 0,8 + 1,96 \dfrac{2\sqrt{2}}{50}$

$(\Rightarrow)$ $0,69 \leq p \leq 0,91$

$\alpha = 0,01 \Rightarrow 0,8 - z_{0,995} \dfrac{S}{n} \leq p \leq 0,8 + z_{0,995} \dfrac{S}{n}$

$(\Rightarrow) 0,8 - 2,526 \dfrac{2\sqrt{2}}{50} \leq p \leq 0,8 + 2,526 \dfrac{2\sqrt{2}}{50}$

$(\Rightarrow)$ $0,65 \leq p \leq 0,946$

b. $\alpha = 0,05$

$x = \left(\dfrac{z_{1-\alpha/2}}{E} \right)^2 f(1-f)$

$= \left(\dfrac{1,96}{0,02} \right)^2 \cdot 0,8 \cdot 0,2 = 1537$

8.33 $f = 0,99$; $\alpha = 0,05$; $z_{0,975} = 1,96$; $E = 0,005$

$x = \left(\dfrac{z_{0,975}}{E} \right)^2 f(1-f) = \left(\dfrac{1,96}{0,005} \right)^2 \cdot 0,99 \cdot 0,01 = 1522$

8.34

a. $\alpha = 0,05$; $z_{0,975} = 1,96$; $E = 0,01$

$x = \left(\dfrac{z_{0,975}}{E} \right)^2 f(1-f) \Rightarrow x = \left(\dfrac{1,96}{0,01} \right)^2 f(1-f)$; Max $x = 9604$

Vậy phải quan sát ít nhất 9604 viên

b. $f = \dfrac{18}{200} = 0,09$; $\alpha = 0,95$; $z_{0,975} = 1,96$; $S = \sqrt{200 \cdot 0,09(1-0,09)} = 4,048$; $E = 0,01$

$0,09 - 1,96 \dfrac{4,048}{200} \leq p \leq 0,09 + 1,96 \dfrac{4,048}{200} \Rightarrow \boxed{0,05 \leq p \leq 0,13}$

$x = \left(\dfrac{1,96}{0,01} \right)^2 \cdot f(1-f) = 3148$.