1. 设 $f(x)$ 连续.

则当 $x=3$ 时,

$$F(x)=2\cdot\frac{x}{2}$$

$$k=2\cdot\frac{3}{2}\quad(\frac{1}{2})$$

$$k=\frac{1}{6}$$

$$E(x)=\int_0^4 xf(x)\,dx$$

$$=\int_0^3 \frac{1}{6}x^2\,dx+\int_3^4 2x-\frac{x^2}{2}\,dx$$

$$=\frac{1}{18}x^3\Big|_0^3 \quad x^2\Big|_3^4-\frac{x^3}{6}\Big|_3^4$$

$$=\frac{27}{18}+\frac{126}{18}-\frac{37}{6}\quad\frac{111}{18}$$

$$=\frac{42}{18}\quad\frac{7}{3}\qquad=\frac{7}{3}$$

$$Var(x) = \int_0^a x^2 f(x)\, dx$$

$$= \int_0^3 \frac{x^3}{6}\, dx + \int_3^4 2x^2 - \frac{x^3}{2}\, dx$$

$$= \frac{1}{24} x^4 \Big|_0^3 + \frac{2}{3} x^3 \Big|_3^4 - \frac{x^4}{8} \Big|_3^4$$

$$= \frac{81}{24} + \frac{2}{3} \cdot 37 - \frac{1}{8} 175$$

$$= \frac{81 + 74 \cdot 8 - 3 \cdot 175}{24} \quad = 81 + 592 - 525 \quad 148\ \frac{3}{6}$$

$$= \frac{37}{6}$$

2.

$$Var(x) = 2.65$$

$$x \sim N(\mu, \sigma^2)$$

置信区间 $\left(\bar{x} - c\frac{\sigma}{\sqrt{n}}, \bar{x} + c\frac{\sigma}{\sqrt{n}}\right)$

$$\bar{x} = 24.9$$

$$c = \begin{cases} 2.58 & 99\% \\ 1.96 & 95\% \end{cases}$$

$$\frac{\sigma}{\sqrt{n}} = \frac{\sqrt{2.65}}{\sqrt{15}} \approx 0.383$$

99%: (23.91, 25.89)

95%: (24.15, 25.65)

3 点估计 未知 t估计

$$SE_{\bar{x}} = \frac{\sigma}{\sqrt{n-1}} = \frac{10}{\sqrt{19}}$$

$$t_{0.05/2}(19) = 2.093$$

$$t_{0.01/2}(19) = 2.861$$

95%: (150.198, 159.801)

99%: (148.436, 161.563)

$$155 + 2.093 \times \frac{10}{\sqrt{19}} = 159.801\ldots$$

$$155 - 2.093 \times \frac{10}{\sqrt{19}} = 150.198\ldots$$

$$155 + 2.861 \times \frac{10}{\sqrt{19}} = 161.563\ldots$$

$$155 - 2.861 \times \frac{10}{\sqrt{19}} = 148.436\ldots$$

4. A BD BAD BCD BE BADE BCDE BF BADF BCDF

$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=3$

BG BADFG BADEG BCDFG BCDEG

BH BADFH BADEH BCDEH BCDFH

BI BADEGI BADFGI BCDEGI BCDFGI

B CA CBA CDA $\frac{1}{2}$

C BD. BE. BF. BH. BG. BI 同A (3)

D AE. AF. AH. AG. AI 5

B 5

C 5

(4)

E A|B|C|D - H|G|I $4\times3\times\frac{1}{2}=6$

E/I

F 同E. (0)

H (0)

G A|B|D|E|F|H - I (1)

I (0)