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النصحيح الفردي لامتحان المداين الأولى
في مادة الإحصاء

حل التمرين الأول (نقطة 2.5)

$$f(x) = \frac{1}{60} = \frac{1}{b-a} \quad (0.25)$$

$$b-a=60$$

$$\mu = 50 = \frac{b+a}{2} \quad (0.25)$$

$$b+a=50(2)=100$$

$$b-a=60 \quad (1) \quad (0.25)$$

$$b+a=100 \quad (2) \quad (0.25)$$

$$b-a+b+a=60+100 \quad (3) \quad (0.25)$$

$$\Rightarrow 2b = 160 \quad (0.25)$$

$$\Rightarrow b = \frac{160}{2}$$

$$\Rightarrow \boxed{b=80} \quad (0.25)$$

$$b-a=60 \Rightarrow a = 80-60 \quad (0.25)$$

$$\Rightarrow \boxed{a=20} \quad (0.25)$$

$$20 < x < 80$$

$$V(x) = \frac{(b-a)^2}{12} \quad (0.25)$$

$$= \frac{60^2}{12} \quad (0.25)$$

$$\boxed{V(x) = 300} \quad (0.25)$$

[3] حساب الاحتمالات التالية

$$P(x=70)$$

$$\int_{70}^{70} f(x) dx = \int_{70}^{70} \frac{1}{60} dx = \frac{1}{60} x \Big|_{70}^{70}$$

$$= \frac{1}{60} (70) - \frac{1}{60} (70) = 0$$

$$- 1 + 2P\left(Z \leq \frac{20}{8}\right) = 0,9544$$

$$2P\left(Z \leq \frac{20}{8}\right) = 1 + 0,9544$$

$$2P\left(Z \leq \frac{20}{8}\right) = 1,9544 \quad (0,25)$$

$$P\left(Z \leq \frac{20}{8}\right) = 0,9772$$

$$\Rightarrow P(Z \leq 2) = 0,9772$$

$$\frac{20}{8} = 2 \Rightarrow \boxed{\delta = 10} \quad (0,25)$$

$$P(484 \leq X \leq 516) = ?$$

$$P\left(\frac{484 - 500}{10} \leq Z \leq \frac{516 - 500}{10}\right) \quad (0,25)$$

$$= P\left(-\frac{16}{10} \leq Z \leq \frac{16}{10}\right) \quad (0,25)$$

$$= P(-1,6 \leq Z \leq 1,6) \quad (0,25)$$

$$= P(Z \leq 1,6) - P(Z \leq -1,6) \quad (0,25)$$

$$= 0,9452 - 0,0548$$

$$= 0,8904 = 89,04\% \quad (0,25)$$

نسب الحليب هو

$$P(a \leq X \leq b) = 92,82\%$$

[3]

$$P\left(\frac{a - 500}{10} \leq Z \leq \frac{b - 500}{10}\right) = 0,9282 \quad (0,25)$$

$$= P\left(\frac{b - 500}{10} \leq Z\right) - P\left(Z \leq \frac{a - 500}{10}\right) = 0,9282$$

$$P\left(Z \leq \frac{a - 500}{10}\right) = P\left(Z \leq \frac{b - 500}{10}\right)$$

$$= P\left(Z \leq \frac{b - 500}{10}\right) - \left[1 - P\left(Z \leq \frac{b - 500}{10}\right)\right] \quad (0,25)$$

$$= 2P\left(Z \leq \frac{b - 500}{10}\right) - 1 = 0,9282 \Rightarrow 2P\left(Z \leq \frac{b - 500}{10}\right) = 1,9282 \quad (0,25)$$

5]

التمرين الثاني: (70 نقاط)

التوزيع الأسي بمتغير x ومتوسط μ بالأيام

[1]

$$P(x \geq 60) = 0,36788$$

$$P(x \geq t) = e^{-\alpha t} \quad f(x) = \alpha \cdot e^{-\alpha x}$$

$$P(x \geq 60) = e^{-\alpha(60)}$$

$$\Rightarrow \frac{1}{e^{60\alpha}} = 0,36788$$

بإدخال اللوغاريتم للتخلص من الأس نجد

$$\ln e^{-60\alpha} = \ln 0,36788$$

$$-60\alpha \approx -1 \Rightarrow \alpha = \frac{-1}{-60} = 0,01666$$

حساب احتمال [2]

$$P(60 \leq x \leq 70) = \int_{60}^{70} f(x) dx$$

$$f(x) = \alpha \cdot e^{-\alpha x} = \frac{1}{60} e^{-\frac{1}{60}x}$$

$$= \int_{60}^{70} \frac{1}{60} e^{-\frac{1}{60}x} dx$$

$$= -e^{-\frac{1}{60}x} \Big|_{60}^{70}$$

$$= -e^{-\frac{1}{60}(70)} + e^{-\frac{1}{60}(60)}$$

$$= -e^{-\frac{7}{6}} + e^{-1}$$

$$= -e^{-\frac{7}{6}} + e^{-1}$$

$$= 0,4244 - 0,3679 = 0,0565$$

[3]

$$P(x \geq t) = 0,22313$$

$$P(x \geq t) = e^{-\alpha t} = e^{-\frac{1}{60}t}$$

$$e^{-\frac{1}{60}t} = 0,22313$$

أي

[3]