OLASILIK TEORİSİ ÖRGÜN GÜZ-2013 Final Çözümleri (2/Ocak/2014)

①

a) 20 p

$$\sum_x f(x) = 1 \quad \text{olması Lazım}$$

$$e^{-1} + e^{-2} + \ln(m) = 1$$

$$0.5032 + \ln(m) = 1$$

$$\ln(m) = 1 - 0.5032$$

$$\ln(m) = 0.4968$$

$$m = e^{0.4968}$$

$$\boxed{m = 1.6434}$$ ✓

b) 20 p

$x < -3 \rightarrow F(x) = 0$ ✓

$-3 \leq x < 1 \rightarrow F(x) = f(-3) = 0.1353$ ✓

$1 \leq x < 4 \rightarrow F(x) = f(-3) + f(1) = 0.1537$ ✓

$4 \leq x \rightarrow F(x) = 1$ ✓

c) 20 p

$$E(x) = -3 \times 0.1353 + 1 \times 0.0183 + 4 \times \ln(2.3311)$$ (0.8463)

$$= -0.406 + 0.0183 + 3.3854 = \boxed{2.9977}$$

$$V(x) = E(x^2) - \mu^2$$

$$= [9 \times f(-3) + f(1) + 16 \cdot f(4)] - \mu^2$$

$$= \boxed{5.7917}$$

$$\sigma = \sqrt{V(x)} = \boxed{2.4066}$$

2. $E = \frac{2.2}{12} = 0,1833$ çukur/km diyelim

a)

$L = 25$ km $\quad \lambda = 25 \cdot E = 4.5833$

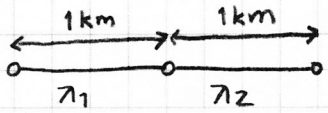
$e^{-\lambda} = 0.0102$

$e^{-\lambda} \cdot \lambda = 0.0468$

$$P(X \geq 2) = 1 - [f(0) + f(1)]$$
$$= 1 - [e^{-\lambda}(1 + \lambda)]$$
$$= 1 - [0.0571]$$
$$= \boxed{0.9429}$$

b) X_1 : 1. km için $\quad \lambda_1 = 0.1833$

X_2 : 2. km " $\quad \lambda_2 = 0.3667$



Tam olarak 1 çukur $\rightarrow P(X_1=0)\,P(X_2=1) + P(X_1=1)\,P(X_2=0)$

olur, buna p diyelim

$f_1(0) = e^{-\lambda_1} = 0,8325$

$f_1(1) = \lambda_1 \cdot e^{-\lambda_1} = 0.1526$

$f_2(0) = e^{-\lambda_2} = 0.6930$

$f_2(1) = \lambda_2 \cdot e^{-\lambda_2} = 0.2541$

$p = f_1(0)\,f_2(1) + f_1(1) \cdot f_2(0)$

$p = 0.8325 \times 0.2541 + 0.1526 \cdot 0.6930$

$\boxed{p = 0.3173}$ ✓