Exercise 2C

7) $X \sim Po(1.8)$

a) $P(X=0) = 0.1652$

$P(X=3) = 0.1606$

$P(X \geq 3) = 1 - P(X \leq 2)$

$= 1 - 0.7306 = 0.2694$

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b) $Y \sim B(4, 0.2694)$

$P(Y=1)$ $^4C_1 \times 0.2694^1 \times 0.7306^3$

$= 0.4202$

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9) $X \sim Po\left(\frac{3}{4}\right)$ breakdowns per week

a) i) $P(X \geq 1) = 1 - P(X=0)$

$1 - e^{-3/4}$

$= 0.5276$

ii) $P(X=2) = \dfrac{e^{-3/4} \times (3/4)^2}{2!} = 0.1329$

b) Prob breaks down next week $= P(X \geq 1)$

$= 0.5276$

Since breakdowns independent

Adding Poisson Distributions.

For independent Poisson variables X and Y

if $X \sim Po(\lambda)$ and $Y \sim Po(\mu)$

then $X + Y \sim Po(\lambda + \mu)$

Exercise 2D

7) $C \sim Po(0.1 \times 12)$ $\quad D \sim Po(0.05 \times 12)$

$C \sim P(1.2)$ $\quad D \sim Po(0.6)$

a) $P(C \geq 1) = 1 - P(C = 0)$

$= 1 - e^{-1.2} = 0.6988$

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b) $P(C \geq 1 \cap D \geq 1)$

$P(D \geq 1) = 1 - e^{-0.6} = 0.4512$

$P(C \geq 1 \cap D \geq 1) = 0.6988 \times 0.4512$

$= 0.31529856$

$= 0.315$

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c) $Y \sim Po(1.2 + 0.6) = Po(1.8)$

$P(Y = 3) = 0.1607$

Classwork and Homework

Exercise 2C Q 8, 10, 12, 14

Exercise 2D Q 6, 8, 10