ECS 315: In-Class Exercise # 13

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: **25** / **10** / 2018			
Name	ID (last 3 digits)		
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Consider the random variable specified in each part below.

i) Write down its (minimal) support.

ii) Find $P[X=1]$. Your answer should be of the form 0.XXXX.

iii) Find $P[X=4]$. Your answer should be of the form 0.XXXX.

	(minimal) support S_X	$P[X=1] = p_X(1)$	$P[X=4] = p_X(4)$
$X \sim \text{Bernoulli}\left(\frac{2}{3}\right)$ (p)	$\{0,1\}$	$= p = \frac{2}{3} \approx 0.6667$	0.0000 because "4" is not in the support
binomial $X \sim \mathcal{B}\left(3, \frac{2}{3}\right)$ (n, p)	$\{0,1,2,3\}$	$= \binom{n}{1} p^1 (1-p)^{n-1}$ $= \binom{3}{1} \frac{2}{3} \left(\frac{1}{3}\right)^2$ $= 3 \times \frac{2}{3} \times \frac{1}{9} = \frac{2}{9} \approx 0.2222$	0.0000 because "4" is not in the support
uniform $X \sim \mathcal{U}(\{2,3,4\})$	$\{2,3,4\}$	0.0000 because "1" is not in the support	$\lvert\{2,3,4\}\rvert = 3$ So, $P[X=4] = \frac{1}{3} \approx 0.3333$
geometric $X \sim \mathcal{G}_1\left(\frac{2}{3}\right)$ (p)	$\{1,2,3,4,\ldots\}$	$= p(1-p)^{1-1}$ $= \frac{2}{3} \times 1 = \frac{2}{3} \approx 0.6667$	$= p(1-p)^{4-1}$ $= \frac{2}{3} \times \left(\frac{1}{3}\right)^3 = \frac{2}{3^4} = \frac{2}{81}$ ≈ 0.0247
Poisson $X \sim \mathcal{P}(3)$ (a)	$\{0,1,2,3,\ldots\}$	$= e^{-3} \frac{3^1}{1!} = 3e^{-3}$ ≈ 0.1494	$= e^{-3} \frac{3^4}{4!} = e^{-3} \frac{3 \times 3 \times 3 \times 3}{4 \times 3 \times 2 \times 1}$ $= \frac{27}{8} e^{-3} \approx 0.1680$