Name: _____

Directions: MAKE SURE TO COPY YOUR ANSWERS TO A SEPARATE SHEET FOR SENDING ME AN ELECTRONIC COPY LATER.

1. (15) Suppose X and Y are independent and have Poisson distributions, then it can be shown that $S = X + Y$ also has a Poisson distribution. Fill the blank *with a term from our course*: We say that the Poisson family is _____ under independent summation.

2. Consider the class enrollment example, p.153.

(a) (15) Give R code to evaluate Equation (7.24).

(b) (15) Give R code to find the upper 10% point for class size, i.e. a number above which only 10% of class exceed.

3. Consider the toy population example, Sec. 9.2.1. Suppose we take a simple random sample of size 2. Imagine a notebook description of this, with columns labeled X_1, X_2 and $\overline{X}$, and infinitely many lines.

(a) (15) What is the number of distinct values in the $\overline{X}$ column?

(b) (10) What is the long-run proportion of rows in which there is a 72 in the X_1 column and a 69 in the X_2 column?

(c) (15) What is the long-run proportion of the value 72 in the X_2 column?

4. (15) A dart is thrown at the interval (0,1). The position D that it hits is a random variable, with density $f_D(t) = 2t$ for $0 < t < 1$ and 0 elsewhere. Find the expected value of the distance from the dart to the point 0.5.

Solutions:

1. closed

2.a

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(1 - pnorm(30,28.8,3.1)) / (1 - pnorm(25,28.8,3.1))
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2.b

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qnorm(0.90,28.8,3.1)
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3.a 3

3.b 1/6

3.c 1/3

4.

$$\int_0^1 |t - 0.5| \; 2t \; dt = \int_0^{0.5} (0.5 - t) \; 2t \; dt + \int_{0.5}^1 (t - 0.5) \; 2t \; dt$$