Homework 4

S320/520

Due at the beginning of class, Thursday 24th September

Please write "S320" or "S520" at the top of your homework. All students should answer all questions. Trosset question numbers refer to the hardcover textbook. Show all working and give R code where appropriate.

1. (a) Suppose that buses go past my stop exactly 30 minutes apart. I arrive at the stop at a completely random time during the day. What is the expected length of time I will have to wait for a bus?

   (b) Suppose that buses go past my father's stop at exactly ten minutes past the hour and thirty minutes past the hour (e.g. 9:10, 9:30) every hour. My father arrives at his stop at a completely random time during the day. What is the expected length of time he will have to wait for a bus?

2. Trosset exercise 5.6.6

3. Trosset exercise 5.6.7 (use R)

4. Trosset exercise 5.6.8

5. Let X be a random variable with PDF

$$f(x) = \begin{cases} \frac{1}{30} & 0 \leq x < 20 \\ \frac{1}{60} & 20 \leq x < 40 \\ 0 & \text{otherwise.} \end{cases}$$

   (a) Find the CDF of X, $F(y)$, for all y.

   (b) Find y such that $F(y) = 0.5$. Is this larger than, smaller than, or the same as EX?

6. (Compulsory for S520, extra credit for S320.) Trosset exercise 5.6.4