

Homework 7

Do the problems on **Webwork** and turn the following problems in class on Friday Mar. 13th.

Homework should be written neatly and clearly explained. If it requires more than one sheet, the sheets must be stapled. Include your name and id number in the top right corner of your homework.

Problem 1. Let $p > 0$ be a real number. Consider function f which has values

$$f(t) = \begin{cases} C_p t^{-p}, & \text{for } t \geq 10 \\ 0, & \text{otherwise.} \end{cases}$$

- (a) For which values of p is there a constant C_p so that this function f is a probability density function for some continuous random variable? What is the value of C_p in these cases?
- (b) For which values of p will this random variable have finite expectation? What is the expectation in these cases?
- (c) For which values of p will this random variable have finite variance? What is the variance in these cases?

Problem 2. You are working as a contractor for a company on a big project. The time it takes you to finish the job is a Normal random variable with mean 20 days, and standard deviation 5 days.

If you finish the job in 18 days or less you get a bonus of 100 dollar. On the other hand, if finish in 27 days or more, you get paid 50 dollars less (which we consider to be a negative bonus). If you finish in between 18 and 27 days you get no bonus (positive or negative). What is the expectation of your bonus?