

Math 477, Homework 10 “the final assignment”

Name: \_\_\_\_\_

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1. Let  $X$  be a normal random variable with mean 3 and variance 2, and let  $Z$  be a normal random variable with mean 0 and variance 1.

(a) Find  $a$  such that  $P(X \leq 4) = P(Z \leq a)$ . Justify your result.

(b) Use table 5.1 in the text (in section 5.4) to compute  $P(3 \leq X \leq 4)$ .

2. Suppose that a die is rolled 100 times. Using the central limit theorem (and table 5.1), estimate the probability that the average die result is between 3.4 and 3.6.

3. Let  $X$  be a random variable with probability density function  $f(x) = \begin{cases} x + 1 & -1 \leq x \leq 0 \\ 1 - x & 0 \leq x \leq 1 \\ 0 & \text{else.} \end{cases}$

Find the moment generating function for  $X$ , and use this to compute  $Var(X)$ .