

Math 421

Quiz 3

You should use the inside front cover of the textbook as a cheat sheet.

Justify all answers with neat and organized work. Clearly indicate your answers. 20 points possible.

1. (4 pts.) Let p equal the proportion of all baseball fans who would say yes to the question, “Would you reach for a foul ball if it came your way, even if it might cause your team to lose the game?” Assume that $p = 0.05$. (Remember that we are talking about how they would answer the question. Never mind that the proportion of fans who actually would reach for such a foul ball is 0.99.) Let X equal the number of fans out of a random sample of size $n = 8$ who would say yes to this question.

(a) How is X distributed?

(b) Give the values of the mean, variance, and standard deviation of X .

(c) Find $P(X = 2)$ and $P(X \geq 2)$.

2. (4 pts.) A random variable X has a binomial distribution with mean 3.6 and variance 2.52. Find $P(X = 4)$.

3. (4 pts.) If the moment-generating function of X is

$$M(t) = \frac{2}{9}e^{2t} + \frac{4}{9}e^{5t} + \frac{1}{3}e^{-t},$$

find the mean, variance, and p.m.f. of X .

4. (4 pts.) For each question on a multiple-choice test, there are five possible answers of which exactly one is correct. If a student answers at random, give the probability that the first question answered correctly is question 3.

5. (4 pts.) Let X be the number of heads showing when two fair coins are tossed. Find the moment-generating function $M(t)$ for X .