

MATH 407 FALL 2009

QUIZ 4

1. Suppose that a die is rolled twice. What are the possible values that the following random variables can take on:
 - (a) the maximum value to appear in two rolls.
1,2,3,4,5,6
 - (b) the minimum value to appear in the two rolls.
1,2,3,4,5,6
 - (c) the sum of the two rolls
2,3,4,5,6,7,8,9,10,11,12
 - (d) the value of the first roll minus the value of the second roll?
-5,-4,-3,-2,-1,0,1,2,3,4,5
2. On a multiple choice exam with 3 possible answers for each of the 5 questions, what is the probability that a student will get 4 or more correct answers just by guessing?
If we let X = the number of correct answers, then X is binomial with $n = 5$, $p = 1/3$. The answer is then

$$\begin{aligned} P(X \geq 4) &= P(X = 4) + P(X = 5) \\ &= \binom{5}{4} (1/3)^4 (2/3)^1 + \binom{5}{5} (1/3)^5 \\ &= \frac{10}{3^5} + \frac{1}{3^5} \\ &= \frac{11}{3^5}. \end{aligned}$$