

University of California, Los Angeles  
Department of Statistics

Statistics 100A

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Exam 1  
21 October 2010

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

**Problem 1 (15 points)**

Three cards are identical in form except that both sides of the first one are colored green, both sides of the second card are colored blue, and one side of the third one is colored green and the other side blue. The three cards are mixed up in a hat, and one card is randomly selected and placed down on the ground. If the upper side of the chosen card is colored green, what is the probability that the other side is colored blue?



**Problem 3 (25 points)**

Answer the following questions:

- a. Show that the determination of negative binomial probabilities can be simplified by making use of the identity

$$P(X = x) = \frac{r}{x} P(Y = r)$$

where  $X$  follows the negative binomial distribution and  $Y \sim b(x, p)$ . As a reminder, in the negative binomial distribution,  $X$  represents the number of trials needed until  $r$  successes occur (each trial has probability of success  $p$ ).

- b.  $A$  and  $B$  alternate rolling a pair of dice, stopping either when  $A$  rolls the sum 9 or when  $B$  rolls the sum 6. Assuming that  $A$  rolls first, find the probability that the final roll is made by  $A$ .

- c. Suppose the number  $X$  of internet users that visit a particular website follow the Poisson distribution with parameter  $\lambda = 3$  per minute. Compute  $P(X > 2 | X > 1)$ .

