

Math 1180 - Spring 2006

Practice Exam 3

April 3, 2006

Turn in your work for the *first three problems* on Monday, April 10. This will count as one of your homework grade.

You are allowed to bring your calculator and one page of note (double-sided) for the exam. Textbook and other notes are not allowed.

PROBLEMS

1. A given tree is swarmed by army ants at a rate of 0.05 per day
 - (a) What is the approximate probability that a tree is swarmed on a given day? What is the exact probability?
 - (b) What is the expected time until the tree is swarmed?
 - (c) What is the expected number of times the tree is swarmed in one year? Assume that a year is 360 days for convenience.
2. Each cow standing in the path of an army ant swarm has a 0.6 chance of not being eaten. A small herd of 6 cows find themselves in the path.
 - (a) What is the expected number of cows that will survive?
 - (b) Assuming cows are attached independently, what is the variance of the number of cows that survive?
 - (c) What is the probability that all cows survive?
 - (d) If cows are worth \$800 per head, what are the expectation and variance of the value of cows that survive?
3. Army ants are beloved by antbirds who follow them around and pick off any insects that escape the ground assault. A series of replicate plots are set up to see how many army ant colonies and how many antbirds move in. The following table gives the probabilities of different results where A represents the number of antbirds and C the number of ant colonies

	$A = 0$	$A = 1$
$C = 0$	0.1	0.05
$C = 1$	0.1	0.15
$C = 2$	0.2	0.40

- (a) Find the marginal distribution for C .
- (b) Find the distribution of A conditional on $C = 0$.
- (c) Are the measurements A and C independent? Why?
- (d) Find the covariance of A and C . What does this number tell you?

4. Section 7.6 – 41-44

5. Section 7.7 – 31, 44,46,48,50

6. Supplementary Problems (p. 692-694) – 9,10,11,13