Exam. I, Math. 323, Fall, 1997 Your name:

This exam. consists of 10 questions. Be sure to show your work. Partial credit may be given if the answer is not correct, and full credit may not be given for a correct answer which is not supported by correct work.

Work in the space beside the questions, and mark your answers there. The numbered spaces below are for scoring, not for answers.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

1. Suppose A and B mutually exclusive events such that P(A) = .4 and P(B) = .5.
   What is $P((A \cup B)^c)$?

   (a) .1 (b) .2 (c) .3 (d) .4 (e) .5

2. In rolling a pair of fair dice, what is the probability of getting a sum of 8 ?

   (a) $\frac{1}{36}$ (b) $\frac{1}{18}$ (c) $\frac{1}{12}$ (d) $\frac{1}{9}$ (e) $\frac{5}{36}$

3. The number of orders per week for a certain product has probability function

$f(s) = \frac{e^{-1}}{s!}$, for s = 0, 1, 2, 3, ... What is the probability of at most 2 orders in a week ?

(a) $2.2e^{-1}$ (b) $2.3e^{-1}$ (c) $2.4e^{-1}$ (d) $2.5e^{-1}$ (e) $2.6e^{-1}$

4. The lifetime t (in years) of a computer chip has continuous probability function

$f(t) = .01\ e^{-.01t}$, for $t > 0$. Find $P(t > 10)$.

(a) .01 (c) .1 (c) e^{-1} (d) $e^{-.1}$ (e) $e^{-.01}$

5. When a copy machine needs repair, 80% of the time, there is a mechanical problem, 30% of the time, there is a problem with the electronic system, and 10% of the time, there are problems of both kinds. Given that there is a problem with the electronic system, what is the probability that there is a mechanical problem as well ?

(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$ (e) $\frac{3}{4}$

6. Of the salmon in Lake Michigan, 40% are planted. All of the planted salmon are of variety A, while among the native salmon (not planted), only half are variety A. If a salmon taken from Lake Michigan is of variety A, what is the chance it was planted ?

(a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{4}{7}$ (e) $\frac{5}{7}$

7. Let A, B, and C be <u>independent</u> events such that P(A) = .6, P(B) = .5, and P(C) = .4. What is P(A∪B∪C) ?

(a) .88 (b) .89 (c) .90 (d) .91 (e) .92

8. A fair die is rolled repeatedly until the number 6 appears. Let s be the number of rolls. What is P(s > 3) ?

(a) $\frac{5}{6}$ (b) $(\frac{5}{6})^2$ (c) $(\frac{5}{6})^3$ (d) $1 - (\frac{5}{6})^2$ (e) $\frac{1}{6}$

9. A fair coin is tossed until it comes up heads. If s is the number of tosses required, what is the probability that s is odd ?

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$ (e) $\frac{5}{6}$

10. A box of fuses contains 4 good ones and 2 defective ones. Suppose you take fuses from the box, one at a time, until you get a good one. If you get a defective fuse, you do <u>not</u> put it back. Let s be the number of fuses taken. What is the probability function ?

s	P(s)
1	
2	
3	