

Math 116 Fall 2003—Practice Problems for Final Exam

1. A hat contains paper slips numbered 1 through 20. Three are drawn at random. What is the probability that they are consecutive (e.g., 5, 6, 7)?
2. Suppose that ten percent of cats have a hyperthyroid condition. The vet offers a test for this condition. 95% of cats with the condition will test positive, while 10% of cats without the condition will test positive. If a cat is chosen at random and tested, what is the probability that the test will be positive? Given that a cat tests positive, what is the probability that the cat has the condition?
3. A box contains 5 red balls and 3 blue balls. I draw 2 balls from the box and put one on my head and one on my nose. Given that the ball on my head is blue, what is the probability that I drew 2 blue balls? Given that at least one of the balls I drew was blue, what is the probability that I drew 2 blue balls?
4. p. 140, # 91
5. A business offers the following health care plan. You deposit \$ $k/2$ at the beginning of the year, and the business also deposits \$ $k/2$. You can use this \$ k all year for health care costs. If your yearly health care costs are less than \$ k , you don't get any of your deposit back. If your yearly costs are more than \$ k , you pay all costs above \$ k out of your pocket.

Let X be the random variable representing your health care costs for the year, and suppose it has the following distribution:

x	\$ 0	\$ 1000	\$ 2000	\$ 4000	\$ 7000	\$ 10000
$P(X = x)$	0.2	0.25	0.25	0.15	0.1	0.05

Would it be better to deposit $k = 1000$ or $k = 2000$ dollars at the beginning of the year (i.e., which choice gives the lower expected total cost).

6. Suppose that 10% of Americans have blue eyes. If you choose 15 Americans at random, what is the probability that between three and five have blue eyes? What is the probability that four or more have blue eyes?
7. p. 199, # 93
8. p. 199, # 96
9. p. 199, # 100 bcde, and compute the median.