MATH 150 Exam III - Probability

Fall 2003

Name:

Instructions

Answer each question in the space provided. You may use the back of the page if necessary. Please **show your work** for full credit.

1. If two die are rolled, what is the probability of getting a 1 on both die?

2. If one die is rolled, what is the probability of getting an even number or a number > 4?

3. The Oregon Department of Transportation, in an effort to help police, has decided that the 3 letters in a license-plate should be allocated in such a way as to make them easy to remember by spelling pronounceable words (like "BOP"). So they have decreed that the first and third letter should be consonants, while the middle letter must be a vowel (A, E, I, O, U).

   (a) How many unique license plates are possible with 3 digits followed by a consonant, a vowel, and a consonant?

(b) That's not a very large number — what's a quick way to add something to the license plate to increase the number of possibilities by a factor of 10 (i.e., 10 * # found in part *a*)?

4. A five-card hand is dealt to you from a 52-card deck.

   (a) What's the probability that you have a pair of kings in your hand?

   (b) What's the probability that you have a pair of *anything* in your hand (e.g., 2's, 3's, kings, etc.)?

5. There are 24 otter-pops in my freezer. 9 are grape, 4 are orange, and 11 are cherry. If you randomly grab three, what's the probability that you get **one of each flavor**?

6. Both your Math and English professor said there was a 3/5 probability that you would have a quiz in their respective classes on Friday. What is the probability that you have a Math **or** English quiz on Friday?

7. You're the manager of an art gallery and have a new artist who will be exhibiting their work. The artist tells you that he has 37 paintings ready for showing.

   (a) However, your gallery only has space for 12 so you must decide which of the 37 paintings to display. You want a "harmonious" display where the chosen paintings work well together and are *arranged* in a sequence for maximum beauty and effect. How many arrangements would you need to consider?

   (b) You pick 12 paintings, 8 of which are landscape, the rest are portraits.

      i. I happen to love this artist's work but I can't decide which I like better. So I decide to buy 3 random paintings. What's the probability that I end up with **at least 1 portrait**?

      ii. If landscape paintings sell for \$800 and portraits sell for \$600, what is the *expected value* of a painting chosen at random from the 12 on display?

8. Suppose there are 100 families in Newberg with 5 children. How many of those families would you expect to have all 5 **daughters**? (Hint: find the probability of having all 5 daughters first).