The second test is in class on Friday 3 February.
Here are some sample questions, so that you have an idea of what to expect.

1. (a) You roll two ordinary (6-sided) dice and add the results.
   What is the probability that you get 7?

   (b) Of 20 bars in Athens, 11 are in violation of sanitary standards, 8 are in violation
   of fire safety standards, and 4 are in violation of both. If you randomly pick one
   of these bars, what is the probability that it is both clean and safe?

   (c) Using the Venn diagram below, determine if the events A and B are independent.
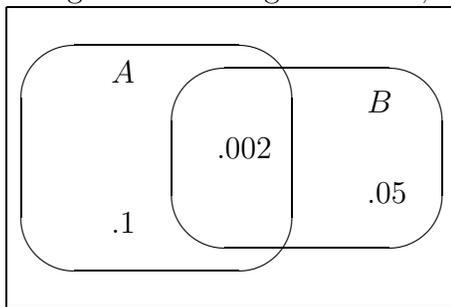
2. Somebody flips a coin and rolls an ordinary (6-sided) die.
   Let A be the event that the die result is 5 or 6, and B be the event that the coin result
   is heads.

   (a) List all the elements in the sample space.

   (b) List all the elements in A. What is $P(A)$?

   (c) List all the elements in B. What is $P(B)$?

   (d) Compute the probabilities:
   $P(AB)$, $P(A \cup B)$, $P(A|B)$, $P(B|A)$, $P(A\overline{B})$, $P(A \cup \overline{B})$

   (e) Draw a Venn diagram, indicating the probabilities of $A\overline{B}$, $B\overline{A}$, AB, and $\overline{A \cup B}$.

3. You are dealt 5 cards from an ordinary deck of 52 cards and see that you have three
   aces and two kings. What is the probability of that happening? Explain your logic.

4. Three production lines contribute to the total pool of a company's product.
   Line one provides 20% to the pool and 10% of its products are defective.
   Line two provides 50% to the pool and 5% of its products are defective.
   Line three provides 30% to the pool and 6% of its products are defective.

   (a) What percent of the items in the pool are defective?

   (b) Suppose an item is randomly selected from the pool and found to be defective.
   What is the probability that it came from line 1?