

**Problem.1.** An eight card hand is drawn from a 52 card deck. Find the probability that:

- (a) the hand contains exactly two picture cards (K, Q, and J).
- (b) the number of pairs is at most three.

**Problem.**The mathematics department at the University of Triscatacaphobia has 13 full professors, 39 associate professors and 26 assistant professors. A committee of 13 is selected at random. What is the probability that the committee is composed of 3 full professors, 6 associate professors and 4 assistant professors?

**Problem.**Prove the "sure-thing principle". If  $P(A|C) \geq P(B|C)$  and  $P(A|C^c) \geq P(B|C^c)$ , then  $P(A) \geq P(B)$ .

**Problem.**Compute the probability that a bridge hand is void in at least one suit. Note that the answer is not

$$\frac{\binom{4}{1} \binom{39}{13}}{\binom{52}{13}}.$$

**Problem.**The following data were given in a study of a group of 1000 subscribers to a certain magazine: In reference to sex, marital status, and education, there were 312 males, 470 married persons, 525 college graduates, 42 male college graduates, 147 married college graduates, 86 married males and 25 married male graduate students. Show that the numbers reported in the study must be incorrect.

**Problem.**If  $P(E) = .9$  and  $P(F) = .8$ , show that  $P(E \cap F) \geq .7$ .