AMERICAN UNIVERSITY OF BEIRUT
STAT 233, Quiz I
March 27, 2003
Time = 50 minutes

You are allowed to use a calculator and one formula sheet!

1. Let the events A and B have $P(A) = 0.5$ and $P(A \cup B) = 0.7$.

    (a) Find $P(B)$ if A and B are independent. [5 pts]

    (b) Find $P(B)$ if $P(A|B) = 0.5$. [5 pts]

2. Let the events A and B have $P(A|B) = P(A^*|B^*) = P(B^*) = 0.95$. Can you determine $P(B|A)$? [10 pts]

3. A fair coin is tossed four independent times. Let X denote the number of times a head is followed immediately by a tail. Find the probability density function, $f(x)$, the cumulative distribution function, $F(x)$, and the moment generating function, $M_X(t)$. [10 pts]

4. A single die is tossed; then k coins are tossed, where k is the number shown on the die. What is the probability of getting exactly 2 heads? [10 pts]

5. Does there exists a continuous random variable X with mean μ_X and standard deviation σ_X such that $P(\mu_X - 2\sigma_X \leq X \leq \mu_X + 2\sigma_X) = 0.6$? [10 pts]