Quiz 2

2004.12.23

1. (45%)

(a) Of the 25 students (11 boys and 14 girls) in the sixth-grade class at St. Andrew School, 5 students were absent Thurday.

(i) What is the probability that two of the absent students were girls?

(ii) What is the probability that none of the absent students were boys?

(b) Each year, 450 accidental deaths due to firearms occur in the 15-24 age group.

(i) What is the average number of accidental deaths due to firearms per month?

(ii) What is the probability of two or more accidental deaths due to firearms in a typical month?

(c) A university has found that 20% of its students withdraw without completing the introductory statistics course. Assume that 20 students have registered for the course this quarter.

(i) What is the probability that more than one will withdraw?

(ii) What is the expected number of withdraws? What is the variance?

2. (35%)

(a) Let X be a continuous random variable with probability density function

$$f(x) = \frac{X + c}{18}, \quad -2 \le x \le 4$$
$$= 0, \quad \text{otherwise}$$

(i)Find c. (ii) Find $P(|X| < 1)$. (iii) Find $E(X)$.

(b) Let X be a discrete random variable representing the number of hours a college student spending on Internet game. The following probability distribution has been proposed.

$$f(x) = \frac{kx}{4}, \quad \text{for} \quad x = 1,\ 2, \text{or } 3,$$

where k is some constant.

(i)Compute k.

(ii)What is the probability that the student spent at least 2 hours on Internet game?

(iii)What is the expected value and variance of X?

3. (30%)

(a) The prior probabilities for events A_1 , A_2 and A_2 are $P(A_1)=0.2, P(A_2)=0.5$ and $P(A_3)=0.3$. Suppose $P(B \mid A_1)=0.5, P(B \mid A_2)=0.4$ and $P(B \mid A_3)=0.3$.

(i) Compute $P(A_1 \cap B)$ and $P(A_2 \cap B)$.

(ii) Apply Bayes' theorem to compute $P(A_1 \mid B)$.

(b) A Daytona Beach nightclub has the following data on the age and martial status of 140 customers.

		Martial Status	
Age		Single	Married
	Under 30	77	14
	30 or Over	28	21

(i) If a customer is under 30, what is the probability that he or she is single?

(ii) What is the probability of finding a customer who is single and under the age of 30?

(iii) Is martial status independent of age? Explan..