

Test on Probability Models - Ross: ch 4 and 5 - Oct 21, 1999

1. (20 marks)

Suggest a probability model to describe the variability of the following measurements (parameter values are not required for this question - just name the model).

Here is a list of the choices:

Bernoulli, Binomial, Negative Binomial, Geometric, Hypergeometric, Discrete Uniform, Zeta, Continuous Uniform, Normal, Exponential, Gamma, Weibull, Cauchy, Beta.

- i) the number of bags of coloured candies that have to be examined before one is found that has no black candy.
- ii) the length of time spent in a queue at Macdonalds while waiting to submit your order.
- iii) the number of customers that must be telephoned before finding 20 that will respond to your telephone survey of customer satisfaction.
- iv) the number of shareholders in favour of firing the company president, from among the 25 shareholders who were selected at random and surveyed for their opinion. (Suppose the company is widely held, like Telus or Mac-Blo).
- v) the number of times (in different issues) a person must buy a 6/49 lottery ticket, before winning the jackpot twice.
- vi) Ten friends go to Las Vegas to gamble for the weekend. Consider the proportion of them that end the weekend ahead (net winnings are positive).
- vii) the width of maple leaves selected from a various maple trees in a forest
- viii) the proportion of words in a book that are longer than 5 letters.
- ix) the time from now until the next recorded earthquake of magnitude greater than 6.
- x) Life-lengths of people born in BC.

2. (9 marks)

What models are related to the exponential distribution, and state the nature of the relationship in each case.

3. (6 marks)

A Beta distribution is proposed to model the variation in the proportion of credits a graduating student has obtained in their major subject. Suggest

reasonable parameters for this Beta distribution and briefly justify your choice.

4. (10 marks) Y is a Geometric random variable with parameter $p=0.2$. What is $P(Y>10|Y>8)$? Justify your answer.