

Exam 3 Practice Problems
Part 3 – Random Variables and Statistics

1. A sample of jelly bean bags is chosen and the number of blue jelly beans in each bag is counted. The results are shown in the table below:

No. of bags	10	9	8	7	6
No. of blue jelly beans	8	9	10	11	12

- (a) What is the expected number of blue jelly beans?
- (b) What is the mean, median, mode, and standard deviation in the number of jelly beans?

2. A bag contains 10 oranges and 2 of them are rotten. What is the expected number of rotten oranges in a sample of 2?

3. Find the range of values for the random variable X in the following experiments and determine if the random variable is finite discrete, infinite discrete or continuous.

(a) Let X be the number of queens in a hand of 5 cards.

(b) Let X be the time in seconds to swim a 50m race

(c) A bowl has 5 red and 5 green marbles. One marble is chosen at random. If the marble is green, it is replaced in the bowl. Let X be the number of times a marble is chosen until a red marble is picked.

4. A game is played where a person pays to roll two fair six-sided dice. If exactly one six is shown uppermost, the player wins \$5. If exactly 2 sixes are shown uppermost, then the player wins \$20. How much should be charged to play this game is the player is to break-even? Round to the nearest cent.

5. Mr. Smith buys a \$4000 insurance policy on his son's violin. The premium is \$50 per year. If the probability that the violin will need to be replaced is 0.8%, what is the insurance company's gain (if any) on this policy?

6. A certain type of battery has an expected useful life of 12 hours with a standard deviation of 2 hours. Use Chebychev's theorem to estimate the following"

(a) A battery lasts between 9 and 15 hours

(b) In a batch of 1200 batteries, how many will last more than 18 or fewer than 6 hours?

(c) Find a value of c such that 84% of the batteries last between $12-c$ hours and $12+c$ hours.

7. The odds in favor that a horse will win a race are 3:11.
What is the probability the horse will win?

8. The probability of rain is 60%. What are the odds in favor of rain?

9. The following data is the recorded daily high temperature in College Station for March 2006:

83, 81, 77, 74, 77, 83, 80, 82, 79, 85,
86, 86, 75, 72, 69, 77, 72, 69, 76, 76,
65, 58, 51, 61, 69, 74, 72, 67, 73, 81, 82

Find the mean, median, mode and standard deviation for the daily high temperature.