Department of Economics

Eller College of Management

The University of Arizona

Pre-session 2017

BNAD 276

Take-home Quiz 2

Due Date: 1pm Wednesday May 24, 2017

- There are 4 questions (7 pages) for a possible total of 13.

- Submit at the beginning of the lecture (1pm) on Wednesday 24 May 2017

Question 1. (1 point) We collected data from 800 employees. For each employee, we ask whether the employee has got promoted to a higher position in last 12 months or not. We also record the genders of the employees. Then, we summarize the data into the following table.

	Male	Female	Total
Promoted	200	90	290
Not Promoted	300	210	510
Total	500	300	800

Show the joint probability distribution table, including marginal probabilities.

Question 2. **(6 points)** There is a random variable X which has the following probability function.

$$f(x) = \begin{cases} \frac{x^2}{10} & \text{for} \ \ x = 2 \\ \frac{1}{5} & \text{for} \ \ x = -1, 0, 1 \end{cases}$$

2.1 (1 point) Is the function $f(x)$ above a valid probability mass function? Explain your answer.

2.2 (1 point) Calculate the expected value of X. Show your work, not just the final number.

2.3 (1 point) Calculate the variance of X. Show your work, not just the final number.

Now we are interested in a random variable $Y = 1 + 3X$.

2.4 (1 point) What is the probability that $Y = 7$?

2.5 (1 point) Calculate $E(Y)$. Show your work, not just the final number.

2.6 (1 point) Calculate $Var(Y)$. Show your work, not just the final number.

Question 3. (3 points) In a day, the probability that Pete catches fish (successfully) when he goes fishing is 0.8. Pete is going fishing 5 days next week. Define the random variable X to be the number of days Pete catches fish (successfully).

3.1 (1 pt) What is the probability that Pete catches fish successfully in **all 5 days**?

3.2 (1 pt) What is the probability that Pete catches fish in **at least 1 day**?

3.3 (1 point) On average, how many days that Pete is able to catch fish? That is, the expected number of days Pete will catch fish (successfully) is . . .

Question 4. (3 points) A receptionist notices that on average, there are 10 students visiting the economics department in a month.

4.1 (1pt) What is the probability of seeing **exactly one** student visiting the department in a month?

4.2 (1pt) What is the probability of seeing **at least one** student visiting the department in a month?

4.3 (1pt) What is the probability of seeing **exactly one** student visiting the department in a week? (Suppose the month has 4 weeks.)