

QUIZ # 1

Statistics 305

Term 2, 2006-2007

Tuesday, January 23, 2007

Time: 2:00pm – 2:30pm

Student Name (**Please print in caps**): _____

Student Number: _____

Notes:

- This quiz has 3 problems on the 4 following pages, plus 1 page of statistical tables. Check to ensure that you have a complete paper.
- The amount each part of each question is worth is shown in [] on the left-hand side of the page.
- Where appropriate, record your answers in the blanks provided on the right-hand side of the page.
- Your solutions **must be justified**; show **all the work** and state **all the reasons** leading to your answer for each question in the space provided immediately under the question.
- Clear and complete solutions are essential; little partial credit will be given.
- This is a closed book exam.
- A single one-sided 8.5 x 11 page of notes is allowed.
- Calculators are allowed (but not for symbolic differentiation or integration).
- No devices (including calculators) that can store text or send/receive messages are allowed.

Problem	Total Available	Score
1.	7	
2.	7	
3.	11	
Total	25	

1. Suppose the random variables X and Y have:

$$\begin{aligned} E(X) &= 1, & E(Y) &= 2, \\ SD(X) &= 3, & SD(Y) &= 4, \\ & \text{and } \text{Corr}(X, Y) = 0.5. \end{aligned}$$

[2] a) $E(2X - Y + 5) =$ _____

[5] b) $SD(2X - Y + 5) =$ _____

2. Suppose $M_X(t)$, the moment generating function of the random variable X , is given by:

$$M_X(t) = \exp\{\theta [\exp(t) - 1]\}.$$

where $\theta > 0$ is an unknown parameter. By direct calculation, evaluate:

Note: Even if you recognize the distribution of X from the form of $M_X(t)$, you are to do the following evaluations using only $M_X(t)$.

[3] a) $E(X) =$ _____

[4] b) $\text{Var}(X) =$ _____

3. Suppose X is a random variable with density function $f_X(x)$ given by:

$$f_X(x) = 2x \quad \text{for } 0 \leq x \leq 1.$$

[2] a) $E(X) =$ _____

[3] b) $\text{Var}(X) =$ _____

- [6] c) Now suppose X_1, X_2, \dots, X_{90} are independent random variables, each having the same distribution as X (as given above) and let $T = X_1 + X_2 + \dots + X_{90}$. The approximate value of $P(T > 65) =$ _____

THE END