

**ECO251 QBA1**  
**THIRD EXAM**  
**Apr 18, 2007**

Name: \_\_\_\_\_  
Student Number: \_\_\_\_\_  
Class time: \_\_\_\_\_

Part I. (16 points) Do all the following (2 points each unless noted otherwise). **Make Diagrams! Show your work!** In particular you must briefly explain how you got the answer to the value of  $z$  at the bottom of this page.

$Z$  has the standardized Normal distribution  $z \sim N(0, 1)$  for the first four problems.

1.  $P(z \geq -1.23)$

2.  $P(-3.25 \leq z \leq 0)$

3.  $P(-3.07 \leq z \leq 3.07)$

4.  $z_{.135}$

$x \sim N(4, 7)$  for problems 5 through 8. Note that all values of  $z$  are rounded to the nearest hundredth.

5.  $P(x \geq -1.23)$

6.  $P(-3.25 \leq x \leq 0)$

7.  $P(-3.07 \leq x \leq 3.07)$

8.  $x_{.135}$

Part II: (9+ points) Do all the following: All questions are 2 points each except as marked. Exam is normed on 50 points including take-home. (Showing your work can give partial credit on some problems! In open-ended questions it is expected. Please indicate clearly what sections of the problem you are answering and what formulas you are using. Neatness counts!) Remember that you may not be able to finish this section, so ration your time on each problem. [Numbers in brackets are a cumulative total]. Justify the substitution of one distribution for another.

1. A small life insurance company receives an average of five death claims a day. Assume that the Poisson distribution is correct. What is the probability that the company will receive more than 10 claims in a given day (rounded to thousandths)? (2)

- a) .986
- b) .005
- c) .014
- d) .032
- e) None of the above (Fill in an answer!)

2. A local family planning group serves 20000 teen-age girls. It costs \$50 to council each pregnant girl. There is a 5% chance that each of the 20000 girls will become pregnant during the year. Each pregnancy can be assumed an independent event. Based on what you know about the expected values of discrete distributions, how much should the agency budget for counseling this year? (2)

- a) \$1000
- b) \$20000
- c) \$50000
- d) \$100000
- e) None of the above.

3. In the agency in problem two, 20 girls are waiting to see a counselor this morning. Half of them are pregnant. If Samantha is assigned to counsel 8 of them, what is the chance that all eight are pregnant? (I want to see your formulas and calculations – this only took me a few minutes.) (3)

4. How many girls would have to be waiting before we could use the Binomial distribution to solve problem 3? (1) [8]

5. OK. Assume that there are 4000 girls waiting to see a counselor and Samantha is assigned to counsel 8 of them, what is the chance that all eight are pregnant? The only answer that I will accept here is an answer gotten from numbers in the tables. If you just write down a solution, you will get half credit. (2)