

**STATISTICS APPLIED TO BUSINESS  
ADMINISTRATION. ACADEMIC YEAR 2012-2013  
SEMINAR 4 (30 MINUTES)**

Date: \_\_\_\_\_

Complete name:\_\_\_\_\_ ID number:\_\_\_\_\_

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**EXERCISE 1 (5 POINTS)**

Let  $X$  be a r.v. with probability density function given by

$$f(x; \theta) = \theta x^{\theta-1}, x \in (0, 1), \theta > 0$$

In order to test the null hypothesis  $H_0 : \theta = 2$  against the alternative hypothesis  $H_1 : \theta = 3$ , a r.s. of size  $n = 1$ ,  $X$ , has been taken.

1. **(2 Points)** Find the form of the most powerful critical region for this test and for the test statistic  $X$ .
2. **(2 Points)** At the 5 % significance level, find the decision rule for this test and for the test statistic  $X$ .
3. **(1 Point)** Compute the power for this test.

**EXERCISE 2 (5 POINTS)**

In a hospital, researchers believe that the weight newborn babies have (in Kilograms) follows a normal  $N(m = 3.30, \sigma^2 = 0.5)$  distribution. In order to test this hypothesis, a random sample of  $n = 200$  newborn babies was taken, providing the following results:

Weight	Less than 3	3 to 4	More than 4
Newborn babies	65	104	31

Using the information provided by the sample and at the  $\alpha = 5\%$  significance level, test the previously specified hypothesis.

**Remark:** This piece of paper should be handed in together with your solutions to the aforementioned exercises. You should also write, both on this piece of paper and in the solutions you provide, the names of the students in your group that have actively participated in this seminar activity.