STATISTICS APPLIED TO BUSINESS ADMINISTRATION
ACADEMIC YEAR 2014-2015
PRACTICAL EXERCISES 6 AND 7 (25 MINUTES)

Date: _____

Complete name:_____ ID number:_____

EXERCISE 1 (10 POINTS)

The following table includes information on the probability mass function a discrete r.v. X has under the null hypothesis ($P_0(x)$) and under the alternative hypothesis ($P_1(x)$).

X	0	1	2	3	4	5	6	7
$P_0(x)$	0.30	0.20	0.20	0	0.10	0.10	0	0.10
$P_1(x)$	0	0.25	0	0.15	0.15	0.15	0.15	0.15

A random sample of size $n = 1$ (i.e., we observe X) will be used to test the null hypothesis $H_0 : P(x) = P_0(x)$ against the alternative hypothesis $H_1 : P(x) = P_1(x)$.

1. **(2.5 points)** Would you include the points $X = \{3, 6\}$ in the critical region? Explain why or why not.

2. **(2.5 points)** Would you include the points $X = \{0, 2\}$ in the critical region? Explain why or why not.

3. **(5 points)** At the 20% significance level and providing all relevant details used to obtain the requires response, find the most powerful critical region for this test. **Remark**: Before providing an answer to this item, take into account your responses to the previous items in this exercise.

EXERCISE 2 (10 POINTS)

A given research focuses on the analysis of the differences in the grades students in the available language groups may have. More specifically, we are interested in analyzing if the language in which the course is being taught has any effect on students' grades. In order to do so, two r.s. of 400 and 150 students, respectively, have been taken in each of the language groups, and information on the grades students obtained (fail, good, very good, and excellent) for the year 2014 was recorded.

	Fail	Good	Very good	Excellent	Total
Language A	120	200	60	20	400
Language B	40	80	20	10	150
Total	160	280	80	30	550

At the $\alpha = 0.05$ significance level and using the available information from the sample, can we state that the there is a significant statistical difference in the grades students have obtained in the two language groups for the course?