Name: _____

Section: _____

An IQ test given to two different groups of high school students produces the following results: group 1 of size 40 has a mean of 112 with a standard deviation of 6 and group 2 of size 60 has a mean of 117 with a standard deviation of 4. Test to see whether group 2 had higher scores than group 1 using the P-value method. Let α=5%.

Solution

$$H_0 : \mu_1 \geq \mu_2$$
$$H_1 : \mu_1 < \mu_2$$

$$Z = \frac{112 - 117}{\sqrt{\frac{36}{40} + \frac{16}{60}}} = -4.63$$

P-Value is the area to the left of -4.63 which is 0, thus we Reject H_0.

Suppose the Acme Drug Company develops a new drug, designed to prevent colds. The company states that the drug is equally effective for men and women. To test this claim, they choose a sample of 100 women and 200 men from a population of 100,000 volunteers. At the end of the study, 38% of the women caught a cold; and 51% of the men caught a cold. Based on these findings, can we reject the company's claim that the drug is equally effective for men and women? Use a 0.05 level of significance and the rejection region method.

Solution
Let women be sample 1 and men be sample 2.

$$H_0 : p_1 = p_2$$
$$H_1 : p_1 \neq p_2$$

$$Z = \frac{.38 - .51}{\sqrt{\frac{.38 * .62}{100} + \frac{.51 * .49}{200}}} = -2.16$$

The rejection region is the area to the left of -1.96 and to the right of 1.96. -2.16 is to the left of -1.96, thus we Reject H_0.