# Claims About Two Proportions

## Test Statistic for Two Proportions

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p} \cdot (1 - \hat{p}) \cdot \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$\hat{p}_1 = \frac{x_1}{n_1}, \quad \hat{p}_2 = \frac{x_2}{n_2}, \quad \hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

Use this information to help answer the questions.

**Problem 1 – I Deserve a Raise!**

In a company, 138 of 1,562 women and 75 of 1,041 men did not receive a yearly raise.

Test the claim that a greater proportion of women did not receive raises. Use α = 0.05.

1. Write the null and alternative hypotheses.

2. Calculate each proportion.

   $\hat{p}$: _____, $\hat{p}_1$: _____, $\hat{p}_2$: _____

3. Calculate the test statistic using the formula.

4. Use the **invNorm** command to calculate the critical value.

5. Do you reject or fail to reject the null hypothesis? Why?

6. Use the **ShadeNorm** command to find the *P*-value. (Select the command by pressing [2nd] [DISTR] and arrow to the DRAW menu. Enter the lower bound and then the upper bound.) Select an appropriate window.

   What is the value? How does it support your decision?

![TI logo] **Claims About Two Proportions**

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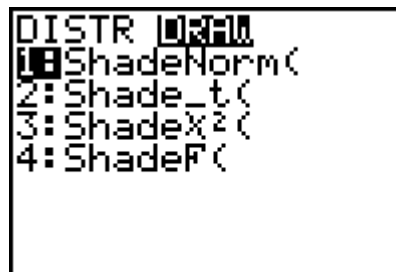
**Problem 2 – Special Training**

In this company, 78 men and 80 women were selected for special training. Of those who attended the training, 51 were men and 64 were women.

Test the claim that the proportions of men and women who attended are significantly different. Use α = 0.05.

7.  Write the null and alternative hypotheses.

8.  $\hat{p}$: _____, $\hat{p}_1$: _____, $\hat{p}_2$: _____

9.  $z$: _____          critical values: _____

10. Do you reject or fail to reject the null hypothesis? Why?

11. *P*-value: _____ How does this support your decision?

**Problem 3 – Job Satisfaction**

In a random sample of 150 men and 150 women at this company, 82% of the men and 88% of women said they were satisfied with their jobs.

Is there enough evidence to suggest that the proportions are significantly different? Test the claim at α = 0.1.

**12.** Write the null and alternative hypotheses.

**13.** Knowing the proportions, find the values of $x_1$ (number of women satisfied) and $x_2$ (number of men satisfied).

**14.** What is the *P*-value?

**15.** Do you reject or fail to reject the null hypothesis? Why?