

Question Two (4-Points)

A sample of 160 small business owners from city A and a sample of 155 small business owners from city B were interviewed by phone. Each person was asked about the impact on their business of a proposed new piece of legislation. The following counts were obtained.

	Favorable	Not Favorable	
City A	70	90	160
City B	40	115	155

Test whether the proportions who favor the legislation from the two cities are different or not Use  $\alpha = 0.05$

1. The hypothesis are:

$H_0: p_1 = p_2$

$H_A: p_1 \neq p_2$

①

2. The test statistic value:

$$\bar{p}_1 = \frac{x_1}{n_1} = \frac{70}{160} = 0.4375, \quad \bar{p}_2 = \frac{x_2}{n_2} = \frac{40}{155} = 0.2581$$

$$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2} = \frac{70 + 40}{160 + 155} = 0.3492$$

$$Z_c = \frac{0.4375 - 0.2581 - 0}{\sqrt{(0.3492)(1 - 0.3492)\left(\frac{1}{160} + \frac{1}{155}\right)}} = 3.34 \quad \} \text{ ①}$$

---

$$Z_{\alpha/2} = Z_{0.025} = 1.96$$

Reject  $H_0$  if  $|Z_c| > Z_{\alpha/2}$

$$3.34 > 1.96 \checkmark$$

3. Decision Rule:

Reject  $H_0$

①

4. conclusion:

The two proportions are different.

①