

3.6 One method of seeding clouds was successful in 57 of 150 attempts, while another method was successful in 33 of 100 attempts. At the 0.05 level of significance, can we conclude that the first method is better than the second?

Hypothesis test, two proportions.

$H_0: P_1 \leq P_2$   
 $\rightarrow H_1: P_1 > P_2$   
 $\alpha = 0.05$

Sample Data

	<u>Method 1</u>	<u>Method 2</u>
$n$	150	100
$x$	57	33
$\hat{p}$	$57/150$	$33/100$
	$\hat{p} \approx 0.38$	$\hat{p} \approx 0.33$

STAT >> TESTS 6: 2-Prop Z Test ...

Critical Value

$$z = 1.645$$

Test Statistic

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - (P_1 - P_2)}{\sqrt{\frac{\bar{P}\bar{Q}}{n_1} + \frac{\bar{P}\bar{Q}}{n_2}}}$$

$$\bar{P} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$\bar{Q} = 1 - \bar{P}$$

$$\bar{P} = \frac{57 + 33}{150 + 100}$$

$$\bar{P} = 0.36$$

$$\bar{Q} = 0.64$$

$$Z = \frac{(.38 - .33) - (0)}{\sqrt{\frac{(.36)(.64)}{100} + \frac{(.36)(.64)}{150}}}$$

$$Z \approx 0.807$$

$$P\text{-Value} \approx 0.210$$

Fail to Reject  $H_0$

There is insufficient evidence to support the claim that the first method of seeding clouds is better than the second method.

STUDY: Chapter 8: Section 8.6

- Testing a claim about two proportions