

## 7.2

12. A study was conducted to determine whether remediation in basic mathematics enabled students to be more successful in an elementary statistics course. (Success here means C or better.) Here are the results of the study:

	Remedial <sup>①</sup>	Non-remedial <sup>②</sup>
Sample size	100 $n_1$	40 $n_2$
# of successes	70	16

- What is the sample proportion of successes for students who did remediation?
- What is the sample proportion of successes with no remediation?
- Give the 95% confidence intervals for successes of both remedial and non-remedial students and compare these two intervals.

$$\hat{p}_1 = \frac{70}{100} \quad \hat{p}_2 = \frac{16}{40}$$

$$z^* = \text{InvNorm}\left(\frac{1.95}{2}\right) = 1.96$$

$$\text{Remedial: } \hat{p}_1 \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1}}$$

$$\text{Non Rem: } \hat{p}_2 \pm z^* \sqrt{\frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

7.3

2. Do you have an insatiable craving for chocolate or some other food? Since many North Americans apparently do, psychologists are designing scientific studies to examine the phenomenon. According to the survey, it was revealed that 97% of the women in the study acknowledged specific food cravings while only 67% of the men did. Assume that 600 of the respondents were women and 400 were men. Find and interpret the 90% confidence interval for the difference between the population proportions.

$$\hat{p}_w = .97 \quad n_w = 600$$

$$\hat{p}_m = .67 \quad n_m = 400$$

$$z_{.90}^* = 1.645$$

$$(\hat{p}_w - \hat{p}_m) \pm z^* \sqrt{\frac{\hat{p}_w(1-\hat{p}_w)}{n_w} + \frac{\hat{p}_m(1-\hat{p}_m)}{n_m}}$$

7.4

12. A 95% confidence interval for the mean of a population is to be constructed and must be accurate to within 0.3 unit. A preliminary sample standard deviation is 2.9. Find the smallest sample size  $n$  that provides the desired accuracy.

$$.3 \geq z^* \frac{\sigma}{\sqrt{n}}$$

$$.3 \geq 1.96 \frac{(2.9)}{\sqrt{n}}$$

Solve for  $n$

7.2 14

14. You want to design a study to estimate the proportion of students on your campus who agree with the statement, "The student government is an effective organization for expressing the needs of students to the administration." You will use a 95% confidence interval and you would like the margin of error of the interval to be .05 or less. Find the minimum sample size required.

$$\hat{p} = ?$$

$$p = ?$$

Use  $p = .5$

$$.05 \geq z^* \sqrt{\frac{.5(1-.5)}{n}}$$

$$.05 \geq 1.96 \frac{\sqrt{.5(.5)}}{\sqrt{n}}$$

$$(\sqrt{n})^2 \geq \left( \frac{1.96 \sqrt{.5(.5)}}{.05} \right)^2$$

7.4

8. Sulfur compounds cause "off-odors" in wine. Wine experts, oenologists, have determined the odor threshold, the lowest concentration of a compound that the human nose can detect. For example, the odor threshold for dimethyl sulfide (DMS) is given in the oenology literature as 25 micrograms per liter of wine. Untrained noses may be less sensitive, however. You suspect that the mean odor threshold for beginning students is higher than the published threshold  $\mu=25$ .

Here are the DMS odor thresholds for 10 ←  $n=10$  beginning students of oenology:

[ 31 31 43 36 23 34 32 30 20 24 ] ← find  $\bar{x}$

Assume that the population is normal and the standard deviation of the odor threshold for untrained noses is known to be  $\sigma=7$ . Find and interpret the 98% confidence interval for the mean odor threshold for beginning students of oenology.

$$z^*_{.98} = 2.326$$

$$\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}}$$