testing hypotheses, the TI-83/84 Plus calculator will display a *P*-value instead of critical values, so the *P*-value method of testing hypotheses is used.

STATCRUNCH Click on **Open StatCrunch.** Click on **Stat,** then select **Proportions.** Select **Two sample,** then select **with summary.** Proceed to enter the numbers of successes and the numbers of observations, click on **Next,** then select either **Hypothesis Test** or **Confidence Interval.** Enter the required values, then click on **Calculate.**

9-2 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Verifying Requirements In the largest clinical trial ever conducted, 401,974 children were randomly assigned to two groups. The treatment group consisted of 201,229 children given the Salk vaccine for polio, and the other 200,745 children were given a placebo. Among those in the treatment group, 33 developed polio, and among those in the placebo group, 115 developed polio. If we want to use the methods of this section to test the claim that the rate of polio is less for children given the Salk vaccine, are the requirements for a hypothesis test satisfied? Explain.

2. Notation For the sample data given in Exercise 1, consider the Salk vaccine treatment group to be the first sample. Identify the values of n_1, $\hat{p}_1$, $\hat{q}_1$, n_2, $\hat{p}_2$, $\hat{q}_2$, $\overline{p}$, and $\overline{q}$. Round all values so that they have six significant digits.

3. Hypotheses and Conclusions Refer to the hypothesis test described in Exercise 1.

a. Identify the null hypothesis and the alternative hypothesis.

b. If the *P*-value for the test is reported as "less than 0.001," what should we conclude about the original claim?

4. Using Confidence Intervals

a. Assume that we want to use a 0.05 significance level to test the claim that $p_1 < p_2$. If we want to test that claim by using a confidence interval, what confidence level should we use?

b. If we test the claim in part (a) using the sample data in Exercise 1, we get this confidence interval: $-0.000508 < p_1 - p_2 < -0.000309$. What does this confidence interval suggest about the claim?

c. In general, when dealing with inferences for two population proportions, which two of the following are equivalent: confidence interval method; *P*-value method; critical value method?

Interpreting Displays. ***In Exercises 5 and 6, use the results from the given displays.***

5. Flu Vaccine A *USA Today* article about an experimental nasal spray vaccine for children stated, "In a trial involving 1602 children only 14 (1%) of the 1070 who received the vaccine developed the flu, compared with 95 (18%) of the 532 who got a placebo." The accompanying TI-83/84 Plus calculator display results from a test of the claim that the vaccine had no effect. Identify the test statistic and *P*-value. What should you conclude about the claim?

TI-83/84 PLUS

```
2-PropZTest
 p1≠p2
 z=-12.38798074
 p=3.137085E-35
 p̂1=.0130841121
 p̂2=.1785714286
↓p̂=.0680399501
```

6. E-mail Privacy Among 436 workers surveyed in a Gallup poll, 192 said that it was seriously unethical to monitor employee e-mail. Among 121 senior-level managers, 40 said that it was seriously unethical to monitor employee e-mail. Consider the claim that for those saying that monitoring e-mail is seriously unethical, the proportion of workers is the same as