

1. In each case, find \hat{p} and \hat{q} .
- $n = 80$ and $X = 40$
 - $n = 200$ and $X = 90$
 - $n = 130$ and $X = 60$
 - $n = 60$ and $X = 35$
 - $n = 95$ and $X = 43$

2. (ans) Find \hat{p} and \hat{q} for each percentage. (Use each percentage for \hat{p} .)
- 15%
 - 37%
 - 71%
 - 51%
 - 79%

3. **Vacations** A U.S. Travel Data Center survey conducted for *Better Homes and Gardens* of 1500 adults found that 39% said that they would take more vacations this year than last year. Find the 95% confidence interval for the true proportion of adults who said that they will travel more this year.
 Source: USA TODAY.

4. **Obesity** A recent study of 100 people in Miami found 27 were obese. Find the 90% confidence interval of the population proportion of individuals living in Miami who are obese.
 Source: Based on information from the Center for Disease Control and Prevention, USA TODAY.

5. **Private Schools** The proportion of students in private schools is around 11%. A random sample of 450 students from a wide geographic area indicated that 55 attended private schools. Estimate the true proportion of students attending private schools with 95% confidence. How does your estimate compare to 11%?

6. **Work Interruptions** A survey found that out of 200 workers, 168 said they were interrupted three or more times an hour by phone messages, faxes, etc. Find the 90% confidence interval of the population proportion of workers who are interrupted three or more times an hour.

7. **Travel to Outer Space** A CBS News/*New York Times* poll found that 329 out of 763 adults said they would travel to outer space in their lifetime, given the chance. Estimate the true proportion of adults who would like to travel to outer space with 92% confidence.
 Source: www.pollingreport.com.

8. **Youth Smoking** A study by the University of Michigan found that one in five 13- and 14-year-olds is a sometime smoker. To see how the smoking rate of the students at a large school district compared to the national rate, the superintendent surveyed two hundred 13- and 14-year-old students and found that 23% said they were sometime smokers. Find the 99% confidence interval of the true proportion, and compare this with the University of Michigan study.
 Source: USA TODAY.

9. **Canoe Survey** A survey of 50 first-time white-water canoers showed that 23 did not want to repeat the experience. Find the 90% confidence interval of the true proportion of canoers who did not wish to canoe the rapids a second time. If a rafting company wants to distribute brochures for repeat trips, what is the minimum number it should print?

1. a) $\hat{p} = \frac{40}{80} = .5$ $\hat{q} = .5$
 b) $\hat{p} = \frac{90}{200} = .45$ $\hat{q} = .55$
 c) $\hat{p} = \frac{60}{130} = .462$ $\hat{q} = .538$
 d) $\hat{p} = \frac{35}{60} = .583$ $\hat{q} = .417$
 e) $\hat{p} = \frac{43}{95} = .453$ $\hat{q} = .547$

2. a) $\hat{p} = .15$ $\hat{q} = .85$
 b) $\hat{p} = .37$ $\hat{q} = .63$
 c) $\hat{p} = .71$ $\hat{q} = .29$
 d) $\hat{p} = .57$ $\hat{q} = .43$
 e) $\hat{p} = .79$ $\hat{q} = .21$

3. $n = 1500$ $\hat{p} = .39$
 $.39 \pm 1.96 \sqrt{\frac{(.39)(.61)}{1500}}$
 $.39 \pm .025$
.365, .4147

4. $n = 100$ $\hat{p} = .27$
 $.27 \pm 1.65 \sqrt{\frac{(.27)(.73)}{100}}$
 $.27 \pm .0733$
.1967, .3433

5. $n = 450$ $\hat{p} = \frac{55}{450} = .1222$
 $.1222 \pm 1.96 \sqrt{\frac{(.1222)(.8778)}{450}}$
 $.1222 \pm .0303$
.0919, .1525 11%
 Focus in our interval

$$6. n = 200 \quad \hat{p} = \frac{168}{200} = .84$$

$$.84 \pm 1.65 \sqrt{\frac{(.84)(.16)}{200}}$$

$$.84 \pm .0428$$

$$(.7972, .8828)$$

$$7. \hat{p} = \frac{329}{763} = .4312$$

$$.4312 \pm 1.65 \sqrt{\frac{(.4312)(.5688)}{763}}$$

$$.4312 \pm .0314$$

$$(.3998, .4626)$$

$$8. \hat{p} = .23$$

$$.23 \pm 2.58 \sqrt{\frac{(.23)(.77)}{200}}$$

$$.23 \pm .0768$$

$$(.1532, .3068)$$

compare to 20%

$$9. \hat{p} = \frac{23}{50} = .46$$

$$.46 \pm 1.65 \sqrt{\frac{(.46)(.54)}{50}}$$

$$.46 \pm .1163$$

$$(.3437, .5763)$$

$$(.3437)50 = 17.185$$

$$x > 17.185$$

18 is minimum to print