

**AP[®] STATISTICS
2002 SCORING GUIDELINES (Form B)**

Question 4

Solution

Part (a):

Large sample confidence interval for a population proportion.

Requires large population ($N \geq 20n$) and large sample. Can consider sample large since

$$n\hat{p} = 1026(.39) = 400.14 \geq 10, \quad n(1 - \hat{p}) = 1026(.61) = 625.86 \geq 10$$

OR $n\hat{p} \geq 5, n(1 - \hat{p}) \geq 5$

OR $\hat{p} \pm 3\sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} = .39 \pm .0298 = (.3602, .4198)$ is within the interval (0, 1).

Computation of 95 percent confidence interval for one population proportion:

$$.39 \pm 1.96\sqrt{\frac{(.39)(.61)}{1026}} = .39 \pm .0298 = (.3602, .4198)$$

If use the calculator with $x = 400$, get (.36002, .41971)

Interpretation of confidence interval:

Based on the sample, we estimate that the proportion of U.S. adults who would respond “make some changes” is between .36 and .42.

OR

We are 95 percent confident that the proportion of all U.S. adults who would respond “make some changes” is between .36 and .42.

Interpretation of the confidence level:

In the long run, 95 percent of the (different) intervals generated using this method will contain the true population proportion.

OR

The *method* used to produce this estimate has a 5 percent error rate.

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Question 4 (cont'd.)

Part (b):

The statement is misleading because in addition to the 39 percent who wanted major change, 19 percent wanted a complete overhaul of the system. These two groups combined represent 58 percent (more than half) of the sample.

OR

Since the confidence interval from part (a) for the percentage of all U.S. adults who would respond “make some major changes” includes 41 percent, we can’t conclude that the two population percentages are different.

OR

The advocate is claiming that we should not change the system on the basis of adding the 30 percent who want to make some minor adjustments to the 11 percent who want to leave the system the way it is now. It is misleading to claim that these 30 percent don’t want to change the system.