SOLUTIONS

COMMENTARY

3.(b) Assumptions for $\hat{z}$ procedures:

- $n \le \frac{1}{10}N$ (or $10n \le N$)

Purpose: So that SRS is nearly equivalent to indep. trials needed for binomial model

- SRS

Given.

- $np \ge 10$
- $nq \ge 10$

} These last two are rules of thumb to make $\hat{z}$ curve a good approx. of the true binomial model.

These are all met.

In order:

Pop. is given to be >20,000, hence much more than 10 times the value of n from part (a): $385 \le \frac{1}{10}(20{,}000) = 2000$ ✓

Must verify in writing (not merely in your head).

SRS: given. ✓

$np \approx n\hat{p} \approx 550(0.5) = 275 > 10$ ✓

$nq \approx n\hat{q} \approx 550(0.5) = 275 > 10$ ✓

We could use $\hat{p} = \frac{282}{550}$ and $\hat{q} = \frac{268}{550}$, except that these weren't given yet.

(c) $\hat{p} = \frac{282}{550} = .513$

$$s.e. = \sqrt{\frac{pq}{n}} \approx \sqrt{\frac{\hat{p}\hat{q}}{n}} = \sqrt{\frac{(.513)(.487)}{550}} = .0213$$

Work is optional, since it was not specifically required. Punch [STAT] TESTS [ALPHA] A if you're in a hurry!

$m.o.e. = (z^*)(s.e.) = 1.645(0.0213) = .035$

Interval: [.478, .548] or [47.8%, 54.8%]

Also OK to say 51.3% ± 3.5% with 90% confidence.

We are 90% confident that the true proportion of Flappy Bird haters among the LPSD students is between 47.8% and 54.8%.