

## Homework #6 Solutions

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3.38, 3.52, 3.55, 3.65, 3.67, 5.5

### Problem 3.38

- (a) Since this question is about opinion polls, in particular, political opinion polls it seems sensible to think of the population "as all adults of voting age in the country in which the question is being asked"
- (b) The "lots of hardwood" are each populations (ie there is more than one population). Each sample of size 5 comes from a separate population.

(2)

(c) The population here is the set of "all households in the United States". It is not clear from the problem exactly what a "household" is. We will assume that a household is "a group of people who live together".

### Problem 3.52

The period with higher "ring-no-answer" is probably the one where there are fewer people at home.

plausible reasons for July 1 - August 31

- summertime months. people might be away on vacation or out due to the longer daytime hours

plausible reasons for Jan 1 - Easter

- Religious holidays?

(3)

In either case a high non response is bad because it may lead to a bias in the results of the survey. For instance, people who are more likely to opt out (eg young people) might well have different opinions than those more likely to be home (eg elderly, homebodies)

### Problem 3.55

- (a) The question is clear and simply worded. However, the phrasing might well be slanted towards warning labels because it mentions cancer which could lead to an emotional response from some people.
- (b) The question is clear, but because it mentions how one option would lead to reduced costs it is slanted towards the agree option.

(c) The question uses a number of more technical and also more elaborate words. For some people this wording might be confusing. The question is also leading because it uses negative terms such as "degradation" and "depletion".

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Problem 3.65

- (a) No the variability will not change. The variability of the sample proportion  $\left(\sqrt{\frac{p(1-p)}{n}} = \hat{\sigma}_p\right)$  depends on the sample size not the population size.
- (b) Yes, because now the sample sizes change from state to state. The highest population states will have largest sample sizes and thus smallest variability. The ~~small~~ low population states will have small samples and higher variability.

### Problem 3.67

See the example simulation online. Note that if your stem and leaf plot has leaf digits other than 0 or 5 it is a pretty good sign that you did not do the simulation.

### Problem 5.5

$X \equiv$  "number of hispanics on committee"

$X$  is Binomial  $n = 15$   $p = .3$

$$\begin{aligned} \text{(a)} \quad P(X=3) &= \binom{15}{3} \cdot 3^3 (1-.3)^{15-3} \\ &= \frac{15!}{3!12!} (.3^3)(.7^{12}) \\ &= .1700 \text{ (4 d.p.)} \end{aligned}$$

$$(b) \quad P(X \leq 3) = P(X=0) + P(X=1) + P(X=2) + P(X=3) \quad (6)$$

$$= \binom{15}{0} \cdot 3^0 (1-3)^{15} + \binom{15}{1} \cdot 3^1 (1-3)^{14}$$

$$+ \binom{15}{2} \cdot 3^2 (1-3)^{13} + \binom{15}{3} \cdot 3^3 (1-3)^{12}$$

$$= 0.0047 + 0.0905$$

$$+ 0.0916 + 0.1700$$

$$= 0.2968$$