



**SIMON**  
SCHOOL OF BUSINESS  
UNIVERSITY of ROCHESTER

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MARKETING 412 - Summer 2013

**HOMEWORK #3**  
**INDIVIDUAL ASSIGNMENT**

**DUE DATE: Wednesday, July 11, 2013 at 5:30 p.m.**

**QUESTION 1: (25 points)**

Acme is a large manufacturer of video games. They are designing a survey to determine consumer attitudes toward video games. As part of this study they wish to determine the percentage of households owning video games and the average usage rate per week. The research department wants to be 95% confident of the results and does not want the error to exceed  $\pm 3$  percentage points for video game ownership and  $\pm 1$  hour for average usage rate. Previous reports indicate that about 20% of the households own video games and that the average usage rate is 15 hours with a standard deviation of 5 hours.

- What sample size would you recommend, assuming that only the percentage of households owning video games is to be determined? Show all your calculations.
- What sample size would you recommend, assuming that only the average usage rate per week is to be determined? Show all your calculations.
- What sample size would you recommend, assuming that both of the preceding variables are to be determined? Why?

After the survey was conducted, the sample results indicated that 30% of the households own video games.

- Compute the 95% confidence interval for the percentage of individuals owning video games. Comment on the degree of precision.

**QUESTION 2: (30 points)**

The VP of Marketing at Whoop Products has just resigned and you have been promoted to the position. Along with this promotion you inherit the data from a recently completed random sample of 5000 firms. The reason for the study was to estimate average sales per firm. A quick look at the results shows that the sales average, over the 5000 firms, is \$150,000. The standard deviation of sales ( $S$ ) is \$200,000 (note that this is the population's standard deviation not the sample mean's deviation).

- a. Soon after you begin the new job, your boss calls you and says he wants to know the precision of the average sales estimate given a 95% confidence level. Using the simple random sample results above, what is the precision of the average sales estimate?
- b. After a little additional digging, you find that the population can be divided into three geographic regions ( $h = 1, 2, 3$ ). Your sample results show that those regions differ in their sample sizes, average sales and standard deviations of sales ( $S$ ).

	<u>EAST</u> ( $h = 1$ )	<u>CENTRAL</u> ( $h = 2$ )	<u>WEST</u> ( $h = 3$ )
True Proportion	.43	.26	.31
Sample Size	2100	1400	1500
Average Sales ( $\bar{x}_h$ )	\$ 229,000	\$ 78,000	\$101,000
Standard Deviation of Sales ( $S_h$ )	\$ 150,000	\$ 90,000	\$ 60,000

With this additional information, can you provide a more precise nationwide average sales estimate? If so, what is it? Explain.

- c. A year goes by and you are told to again estimate nationwide average sales per firm. You believe average sales for the different segments have changed but the standard deviations of sales and the true proportions have not. Using this knowledge, what sample size would be required if you desired a confidence level of 95% and an accuracy of \$5,000? Explain why your answer differs from part b.
- d. In addition to the overall national sales average, Acme also is interested in analyzing the East Region separately. To insure that the mean sales estimate for the East Region has an accuracy of \$10,000 and a confidence level of 95%, do you need to add more East region respondents to those already required for part c? Explain.

**QUESTION 3: (25 points)**

A local bank was interested in determining how it might better serve the needs of low-income households. It inserted an eight-page survey into the monthly statement-of-account mailings of all account holders with less than \$300 in their savings account. 1,500 surveys were mailed and 76 were completed and returned. IDENTIFY 3 likely problems in this survey design and explain how each might be fixed. Your discussion of each problem and its potential fix should be no longer than 4 sentences.

**QUESTION 4: (20 points)**

Suppose an airline handed out to its passengers the following 3 question questionnaire. Provide a no more than 3 sentence critique of each question.

1. What is your income to the nearest hundred dollars? \_\_\_\_\_

2. What are the most salient and determinant attributes in your evaluation of air carriers? (Please list all in order of importance to you).

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3. Do you think it is right for the government to tax airline tickets and deprive a lot of people of the chance to fly? (check one) Yes \_\_\_ No \_\_\_ Only on Weekdays \_\_\_\_\_