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Bus 274: Further Statistics for Business

Spring 2015

PROBLEM SHEET # 6

Problem 1: In a sample of 596 Bilgi University students in 2011, 74.8% said they recycle paper/glass/metal at least sometimes (if possible). The error margin at a confidence level of 95% is 3.5 percentage points (3.5%).

a) Why is the error margin useful in this example? Explain briefly.

b) Compute an approximate 95% confidence interval for the share of those who say they recycle at least sometimes.

c) How big should the sample be if we wished to reduce the error margin to 1 percentage point? Give reasons for your answer.

Problem 2: A consumer protection agency monitors vegetable quantity in packages sold by a retailer. A sample of 10 packages of potatoes labeled "2500g" had weights (in grams)

2473, 2515, 2503, 2421, 2466, 2475, 2415, 2373, 2412, 2435

(The sample mean is $\bar{x} = 2448.8$; the sample standard deviation is $s = 44.84$.)

a) Assuming vegetable weight is normally distributed, compute a 95% confidence interval for the expected weight in a package.

b) According to your result in (a): Should the consumer protection agency undertake further investigations at this point, or even take action against the retailer? Give reasons for your answer.

Problem 3: It was found in a recent survey that about 47% of university students of business administration in Germany prefer to buy electronic products such as an MP3 player online, rather than from a traditional shop. The margin of error was computed as 5 percentage points at a confidence level of 95%. The number of students in this survey was 370.

a) Write the mathematical expression for the margin of error in this example, with all numbers plugged in correctly.

b) When we increase the confidence level to 99%: Will the margin of error become smaller or larger? Give a precise answer, using your result in (a).

c) Is it possible to reduce the margin of error to half its previous value, that is, to 2.5 percentage points, while keeping the confidence level of 95%? Is it possible to reduce the margin of error to zero? Give reasons for your answer and point out the practical implications for this survey.

d) Using the margin of error above (that is, 5 percentage points), give a 95% confidence interval for the share of university students who prefer buying online.