

14. Junk mail. Direct mail advertisers send solicitations (a.k.a. "junk mail") to thousands of potential customers in the hope that some will buy the company's product. The response rate is usually quite low. Suppose a company wants to test the response to a new flyer, and sends it to 1000 people randomly selected from their mailing list of over 200,000 people. They get orders from 123 of the recipients.

- Create a 90% confidence interval for the percentage of people the company contacts who may buy something.
- Explain what this interval means.
- Explain what "90% confidence" means.
- The company must decide whether to now do a mass mailing. The mailing won't be cost-effective unless it produces at least a 5% return. What does your confidence interval suggest? Explain.

15. Safe food. Some food retailers propose subjecting food to a low level of radiation in order to improve safety, but sale of such "irradiated" food is opposed by many people. Suppose a grocer wants to find out what his customers think. He has cashiers distribute surveys at checkout and ask customers to fill them out and drop them in a box near the front door. He gets responses from 122 customers, of whom 78 oppose the radiation treatments. What can the grocer conclude about the opinions of all his customers?

16. Local news. The mayor of a small city has suggested that the state locate a new prison there, arguing that the construction project and resulting jobs will be good for the local economy. A total of 183 residents show up for a public hearing on the proposal, and a show of hands finds only 31 in favor of the prison project. What can the city council conclude about public support for the mayor's initiative?

17. Death penalty, again. In the survey on the death penalty you read about in the chapter, the Gallup Poll actually split the sample at random, asking 538 respondents the question quoted earlier, "Generally speaking, do you believe the death penalty is applied fairly or unfairly in this country today?" The other half were asked "Generally speaking, do you believe the death penalty is applied unfairly or fairly in this country today?" Seems like the same question, but sometimes the order of the choices matters. Suppose that for the second way of phrasing it, only 44% said they thought the death penalty was fairly applied.

- Construct a 95% confidence interval for the true proportion of adults who approve of the way the death penalty is currently applied, according to the responses for this second question.
- Recall that 53% of the respondents in the other random half of the study said that the death penalty is applied fairly. Does a proportion of 0.53 fall inside the confidence interval you just found?