

Lesson 17: Inference for One Proportion

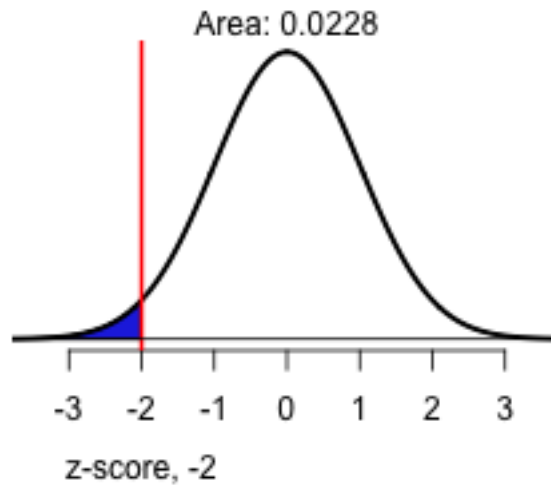
Homework

Solutions

Please note that the steps show rounded numbers, but that the final answers to the problems are calculated without rounding.

| Problem | Part | Solution |
|---------|------|---|
| 1 | - | $n\hat{p} \geq 10$ $n(1 - \hat{p}) \geq 10$ $100(0.12) = 12 \geq 10$ $100(1 - 0.12) = 88 \geq 10$ The requirements are met. |
| 2 | - | $\hat{p} = 0.12$ |
| 3 | - | (0.067, 0.173) We are 90% confident that the true proportion of peanuts in the can is between 6.7% and 17.3%. |
| 4 | - | $np \geq 10$ $n(1 - p) \geq 10$ $100(0.2) = 20 \geq 10$ $100(1 - 0.2) = 80 \geq 10$ Since both conditions are true, we conclude that n is sufficiently large so that \hat{p} will be approximately distributed. |
| 5 | - | $\hat{p} = 0.12$ |
| 6 | - | $H_0 : p = 0.2$ $H_a : p < 0.2$ |
| 7 | - | $z = -2$ |
| 8 | - | $P\text{-value} = 0.0228$ |

Normal Probability Applet

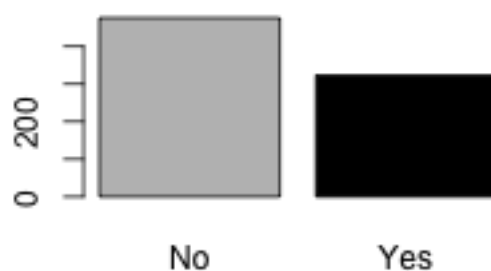


- 9 -
- 10 - reject the null hypothesis
- 11 - There is sufficient to suggest that the proportion of peanuts in the can is less than 20%.
- 12 - (0.023, 0.024) We are 95% confident that the true proportion of the population who die after contracting H1N1 is between 2.3% and 2.4%.
- 13 - (0.547, 0.639) We are 95% confident that the true proportion of the population who die after contracting H5N1 is between 54.7% and 63.9%.
- 14 - The bird flu (H5N1) is by far more deadly! More than half of those who contract the bird flu will die, compared to only 2 to 3% of those who are infected with the swine flu. Fortunately for us, the bird flu is currently only passed to humans through contact with infected birds. Epidemiologists are concerned about a global pandemic of this disease, which would almost surely happen if the virus mutates to allow human-to-human transmission.
- 15 - $n = 423$ people
- 16 - $n = 334$ people

| Problem | Part | Solution |
|---------|------|----------|
|---------|------|----------|



17 -



- 18 - $np \geq 10$
 $n(1 - p) \geq 10$
 $800(0.43) = 344 \geq 10$
 $800(1 - 0.43) = 456 \geq 10$
Since both conditions are true, we conclude that n is sufficiently large so that \hat{p} will be approximately distributed.
- 19 - $\hat{p} = 0.405$
- 20 - $H_0 : p = 0.43$
 $H_a : p \neq 0.43$
- 21 - $z = -1.428$
- 22 - $P\text{-value} = 0.1532$
- 23 - fail to reject the null hypothesis
- 24 - There is insufficient to suggest that the proportion of adults who received a phishing email in 2012 is different than 43%.