

Answer on Question #56150 – Math – Statistics and Probability

A 2011 Gallup poll found that 76% of Americans believe that high achieving high school students should be recruited to become teachers. This poll was based on a random sample of 1002 Americans

- a) find a 90% confidence interval for the proportion of Americans who would agree with this
- b) interpret your interval in this context
- c) explain what 90% confidence means
- d) do these data refute a pundit's claim that $\frac{2}{3}$ of Americans believe this statement? Explain

Solution

- a) A 90% confidence interval for the proportion of Americans who would agree with this is

$$CI = \left(p - z^* \sqrt{\frac{p(1-p)}{n}}; p + z^* \sqrt{\frac{p(1-p)}{n}} \right),$$

where $z^* = 1.645$ for 90% confidence level.

$$CI = \left(0.76 - 1.645 \sqrt{\frac{0.76(1-0.76)}{1002}}; 0.76 + 1.645 \sqrt{\frac{0.76(1-0.76)}{1002}} \right) = (0.738; 0.782),$$

- b) We can be 90% confident that true proportion of Americans who would agree with this lies between 0.738 and 0.782.
- c) 90% confidence means that we have a 0.90 probability of containing the population mean proportion in this interval.
- d) Yes. $\frac{2}{3} \approx 0.667$ is outside 90% confidence interval.