

Answer on Question #67666 – Math – Statistics and Probability

Question

A newspaper reports that the governor's approval rating stands at 54%. The article adds that the poll is based on a random sample of 4134 adults and has a margin of error of 2%. What level of confidence did the pollsters use?

Solution

If $n\hat{p} \geq 10$ and $n(1 - \hat{p}) \geq 10$ we can use the following formula to compute the margin of error for a sample proportion:

$$ME = z^* \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}},$$

where \hat{p} is a sample proportion, n is the sample size, z^* is the multiplier dependent on the level of confidence:

Confidence Level	z^* multiplier
90%	1.645
95%	1.960
98%	2.326
99%	2.578

In our case $\hat{p} = 0.54$, $n = 4134$, $ME = 0.02$.

Conditions $n\hat{p} \geq 10$ and $n(1 - \hat{p}) \geq 10$ are met. Hence

$$z^* = \frac{ME}{\sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}} = \frac{0.02}{\sqrt{\frac{0.54(1 - 0.54)}{4134}}} \approx 2.58,$$

which corresponds to approximately 99% level of confidence.

Answer: 99%.