critical value for z

Confidence Intervals for Proportions

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

margin of error

Confidence Statement:

decimal

We are 99 % confident the true proportion of starlings died is between .03 to .23

or

We are ___% confident the true percentage of _____ ____ is between 3% to 23%

Before approval is given to a new pesticide, the United States Department of Agriculture (USDA) requires that several tests be performed to see how the substance will affect wildlife. I particular, the USDA would like to know the proportion of starlings that will die after being exposed to the pesticide. A random sample of eighty starlings were caught and fed their regular food, which had been treated with the substance. After 10 days, ten starlings had died. Use a 99% confidence interval to estimate the true proportion of starlings that will be killed by the substance.

$n = 80$

$\hat{p} = \frac{10}{80} = .125$

$z^* = 2.58$

$.125 \pm 2.58\sqrt{\frac{.125(.875)}{80}}$

$.125 \pm .095$

.03 to .23

A tire manufacturer interested in estimating the proportion of defective automobile tires it produces tested a sample of 490 tires and found twenty-seven to be defective. Find a 90% confidence interval for Θ, the true fraction of defective tires produced by the firm. Interpret this result.

$n = 490$ $\quad \hat{p} = \frac{27}{490} \approx .055$

$z^* = 1.64$

$.055 \pm 1.64\sqrt{\frac{.055(.945)}{490}}$

$.055 \pm .017$

$.055 - .017 = .038$

$.055 + .017 = .072$

We are 90% confident

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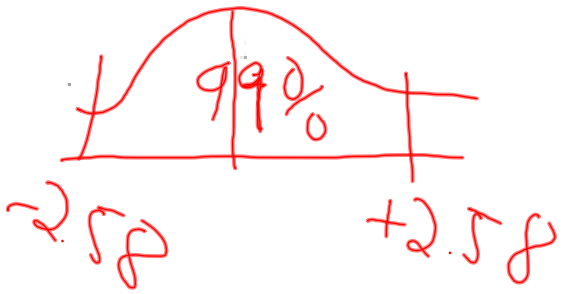
Critical Values of z*

normal distributions

C	z^*	C	z^*
0.50	0.67	0.80	1.28
0.55	0.76	0.85	1.44
0.60	0.84	0.90	1.64
0.65	0.93	0.95	1.96
0.70	1.04	0.99	2.58
0.75	1.15	0.999	3.29



Confidence Intervals for proportions