Answer on Question #84602 – Math – Statistics and Probability

Question

We would like to estimate the true mean weight of a certain breed of cats. Suppose it is known that weights follow a normal distribution with standard deviation 5.5 pounds.

a. What sample size is required to estimate the true mean weight to within 4 pounds with 94% confidence?

Solution

a. $SE = z_{0.03}\frac{\sigma}{\sqrt{n}} \rightarrow n = \left(\frac{z_{0.03}\sigma}{SE}\right)^2 = \left(\frac{1.881*5.5}{4}\right)^2 = 7.$

Question

It is calculated that, in order to estimate the true mean weight of a different breed of cats (that is, σ = 5.5 no longer applies) to within 4 pounds with 95% confidence, we would need a sample of 50 cats.

b.How many cats would we need to sample in order to estimate the true mean weight to within 3 pounds with 95% confidence?

Solution

b. $\sigma = \frac{SE\sqrt{n}}{z_{0.025}} = \frac{4*\sqrt{50}}{1.96} = 14.4.$

$n = \left(\frac{z_{0.025}\sigma}{SE}\right)^2 = \left(\frac{1.96*14.4}{3}\right)^2 = 89.$