

**Show All Work!!!!**

1. Find the critical value  $z_c$  that corresponds to an 88% confidence level.
2. Find the critical value,  $t_c$ , for  $c = 0.90$  and  $n = 22$ .
3. Find the margin of error for the given information:
  - a.  $c = 0.90$ ,  $\sigma = 5.8$ ,  $n = 52$  (one decimal place)
  - b.  $c = 0.95$ ,  $s = 3.6$ ,  $n = 45$  (one decimal place)
  - c.  $c = 0.90$ ,  $\hat{p} = 0.36$ ,  $n = 40$  (three decimal places)
4. Use the given confidence interval to find the sample mean and the margin of error: (42.8, 57.6).
5. We start with a simple random sample of 25 of a particular species of newts and measure their tails. The mean tail length of our sample is 5 cm. Assume the tail lengths are normally distributed.
  - a. If we know that 0.2 cm is the standard deviation of the tail lengths of all newts in the population, then what is a 90% confidence interval for the mean tail length of all newts in the population? (one decimal place)
  - b. If we find that that 0.2 cm is the standard deviation of the tail lengths of the newts in our sample population, then what is a 90% confidence interval for the mean tail length of all newts in the population? (one decimal place)

6. In a survey of 1000 U.S. teens, 372 said they own a smart phone. Construct a 95% confidence interval for the proportion of teens who say they own a smart phone. Interpret the results. (three decimal places)
  
7. A researcher at a major hospital wishes to estimate the proportion of the adult population of the U.S. that has high blood pressure.
  - a. How large a sample is needed in order to be 99% confident that the sample proportion will not differ from the true proportion by more than 8%?
  
  - b. What if a previous study indicates that the proportion of U.S. adults with high blood pressure is 23%? What is the minimum sample size now?
  
8. The standard IQ test has a mean of 97 and a population standard deviation of 18. We want to be 90% certain that we are within 5 IQ points of the true mean. What is the minimum sample size required?
  
9. In a random sample of 12 senior-level chemical engineers, the mean annual earnings was \$133,326 and the standard deviation was \$36,729. Assume the annual earnings are normally distributed and construct a 95% confidence interval for the population mean annual earnings for senior-level chemical engineers. Interpret the results. (nearest dollar)