

1. From a sample of 132 college students you find that the average number of hours slept each night is 6.3. Assume the population standard deviation is known,  $\sigma = 1.65$  hours.
  - (a) Set up hypotheses to test if the average number of hours slept by college students is different from 8.2; use a significance level of  $\alpha = 0.01$ .
  - (b) Evaluate the above hypothesis test and state your conclusion.
  - (c) Calculate an appropriately matching confidence interval.
  - (d) Interpret your confidence interval.
  - (e) Does your hypothesis test conclusion match the conclusion from your confidence interval?
  - (f) How much do we care about the shape of the population distribution? Why?
  
2. Biologists are often interested in population dynamics of groups of animals. Some mathematical models claim that if less than half of a population is not producing at least four offspring on average, then that group is destined to population decline. From a sample of 111 (offspring producing) individuals from the Order Carnivora, suppose you found that 53 produced at least 4 offspring. Hint: look up the standard deviation of a Bernoulli random variable.
  - (a) Set up hypotheses to test if the Order Carnivora is destined to population decline; use a level of significance of  $\alpha = 0.01$ .
  - (b) Evaluate the above hypothesis test and state your conclusion.
  - (c) Calculate an appropriately matching confidence interval.
  - (d) Interpret your confidence interval.
  - (e) Does your hypothesis test conclusion match the conclusion from your confidence interval?