

1. The Threaded Screw Products Co., Inc. makes #8 wood screws that are intended to have a mean torque strength of 150 in-lbs. Engineers at the company routinely test screws in a destructive process to ensure the mean torque strength is at least 150 in-lbs. In the most recent batch, the engineers tested 50 random screws and found a sample mean torque strength of 149.5 in-lbs. They know the standard deviation around the mean is 8.3 in-lbs.

- (a) Construct confidence intervals for the population mean torque strength for the following confidence levels using the Empirical Rule.

- i. 68%

- ii. 95%

- iii. 99.7%

- (b) Construct confidence intervals for the population mean torque strength for the following confidence levels.

- i. 75%

- ii. 90%

- iii. 99%

- Iowa State University would like to understand student debt when graduating from the University. They take a random sample of 80 graduating seniors and find that their average debt is \$13,500. The University knows the standard deviation around the average debt is \$4,000. Construct an 85% confidence interval for the mean student debt.
- Proctor & Gamble is trying to understand usage of its Old Spice deodorant. They obtain a random sample of 121 customers and find that in the past year the average number of days a customer used Old Spice is 205 days. P&G knows that the variance around the population mean is 196 days². Construct a 97% confidence interval for the mean number of days Old Spice is used across its customers.