

Instructions: Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown. Answer all parts of each problem. Provide explanations as indicated. You may use Minitab or any other statistical software (such as a calculator or Excel) to complete any required statistical calculations or graphs.

1. A machine produces ball bearings whose size follows a normal distribution with a mean diameter of 3 cm and a standard deviation of 0.2 cm. Use this information to answer the following questions.
 - a. What percent of the ball bearings produced by the machine have a diameter larger than 3.5 cm?
0.0062
 - b. What percent of ball bearings produced fall between 2.9 cm and 3.1 cm?
0.3829
 - c. How large are the smallest 10% of ball bearings produced? Round to two decimal places.
Smaller (or equal to) 2.74 cm.

2. Based on subscriptions to local papers, a polling company determined that 27% of Americans have access to a newspaper subscription delivered at least once per week to their homes. A polling company was interested in determining whether that subscription rate accurately reflected the number of people who read the paper newspapers at least that often. They surveyed 1000 people for their study. Answer the following questions about their results using the normal approximation to the binomial.
 - a. What is the probability that exactly 270 respondents said they read a newspaper at least once per week?

$$\mu = np = 270, \sigma = \sqrt{npq} = 14.04$$

0.0284

- b. What is the probability that more than 300 respondents said they read a newspaper at least once per week?
0.0178
- c. What is the probability that between 250 and 290 respondents said they read the newspaper at least once per week?
0.8557