**Margin of Error Practice**

***Find the margin of error for each of the following and create an interval for the true population proportion.***

* + - 1. A sample of 550 people leaving a shopping mall showed that 64% of shoppers claim to have spent over $25.
      2. In a random sample of machine parts, 18 out of 225 were found to have been damaged in shipment.
      3. A telephone survey of 1000 adults was taken shortly after the U.S. began bombing Iraq found that 832 adults voiced their support for this action.
      4. An assembly line does a quality check by sampling 50 of its products. It finds that 16% of the parts are defective.

***Now let’s look at how the sample size will affect the margin of error. Let’s say we have a proportion of 20%:***

5. Find the margin of error for a survey of 90 American teens.

6. Find the margin of error for a survey of 9,000 teens.

7. Find the margin of error for a survey of 90,000 teens.

8. Draw a conclusion about the margin of error based on the size of the sample. Why do you think this is so?

9. If you want to cut your margin of error in half, what would you have to do to the sample size? Why?

***Find the margin of error for the following and an interval that could contain the true mean:***

10. You want to rent an unfurnished one-bedroom apartment for next semester. The mean monthly rent for a random sample of 10 apartments advertised in the local newspaper is $540 with a standard deviation of $80.

11. Your company sells exercise clothing and equipment on the Internet. To design the clothing, you collect data on the physical characteristics of your different types of customers. Here are the weights (in kilograms) for a sample of 24 male runners: 67.8 61.9 63.0 53.1 62.3 59.7 55.4 58.9 60.9 69.2 63.7 68.3

65.6 56.0 57.8 66.0 62.9 53.6 65.0 55.8 60.4 69.3 61.7 64.7

12. A hardware manufacturer produces bolts used to assemble various machines. Suppose the average diameter of a simple random sample of 50 bolts is 5.11 mm and the standard deviation is 0.1 mm.

13. We have IQ test scores of 31 seventh-grade girls in a Midwest school district. We have calculated that sample mean is 105.84 and the standard deviation is 14.27.

14. Let’s look at problem #13 again. How would the margin of error change if there were 90 girls instead of the 31?

15. What if there were 250 girls?

16. How does the sample size change the margin of error?

17. In a survey of 750 adults, 14% said they watch television more than 12 hours per week.

a) What is the margin of error for this survey?

b) Give an interval that is likely to contain the true proportion of all people who watch television more than 12 hours per week.

c) The news team from WPIG TV reported that 18% of all adults watch more than 12 hours of television per week. Using your interval from part (b), how do you feel about the report? Explain your answer thoroughly.

18. Julie opens a package of potato chips and believes that her package is not filled properly. The package states that it contains 31.8 grams of potato chips. She buys 10 bags and weighs the contents of each and finds the following weights:

31.9, 31.2, 31.8, 32.0, 31.1, 31.5, 31.6, 31.9, 31.2, 31.6.

a) Find the mean and standard deviation of Julie’s sample.

b) Find the margin of error.

c) Find an interval that is likely to contain the true mean weight in grams of all bags of potato chips of this variety.

d) Does Julie have a reason to complain? Use your interval to explain your answer thoroughly.

19. A news reporter reports the result of a survey and states that 51% of the voters will vote for Charlie Brown with a margin of error of ± 5%. Should Charlie Brown start celebrating his victory? Why or why not?