

Name: \_\_\_\_\_

**FOM 11**

**Statistics Project**

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You will work with a partner, and collect quantitative (numbers) data on something that traditionally follows a Normal Distribution.

For example, you may want to collect data on the mass of each male in grade 12. Or, maybe the average height of females in grade 11. When deciding on the data you wish to collect, you must first **be sure (research) that it follows a Normal Distribution**, as not all data does.

**Answer each question in complete sentences, and show all work for mathematical calculations:**

- 1) What is the premise/question for your survey? /1
- 2) Who is your population (must be greater than 50)? /1
- 3) Can you survey your entire population, or will you take a sample (if you take a sample, your sample size must exceed 30)? Why? /1
- 4) Describe how you will conduct your data collection (what is your sampling technique – who will you ask, how will you choose who to ask, how many people will you ask)? Be **specific** in your explanations. /2
- 5) What is your sample size ( $n$ )? /1
- 6) Give your raw data (should include units used). /2
- 7) Calculate the sample mean ( $\bar{x}$ ). /2
- 8) Calculate the median. /2
- 9) Calculate the mode. /1
- 10) Calculate the standard deviation,  $s$ , of your data. \*Note that  $s$  is the symbol for the standard deviation of a **sample**, whereas  $\sigma$  (sigma) is the symbol for the standard deviation of a **population**. If your sample size,  $n$ , is greater than or equal to 30, then you can assume that  $s = \sigma$ . /3
- 11) Calculate a **z-score** for each piece of data. You only have to show work for one Z-score calculation. /3

12) Use your **z-score** to find what percentage of data is within 1 standard deviation of your mean? Theory says 68% of the data should be within 1 standard deviation (a **z-score** between -1 and 1). Is this the case with your data? Why isn't it exactly 68%? /3

13) Use your **z-score** to find what percentage of data is within 2 standard deviations of your mean? Theory says 95% of the data should be within 2 standard deviations (a **z-score** between -2 and 2). Is this the case with your data? /2

14) Does your data contain any **outliers** (pieces of data that are more than 3 standard deviations from your mean)? Theoretically, only 0.3% (3 out of 1000) data points should be an outlier. /1

15) Do you have the same number of data points below your mean as above your mean? If not, why would this be the case? /2

16) Calculate the raw score that 75% of your population would exceed. /2

17) Calculate the raw score that 20% of your population would exceed. /2

18) Calculate and report a 95% Confidence Interval for your Mean. Your answer can be given in a sentence similar to the italics in Example 1 in the 5.4 notes. /3

19) What does your answer from #18 actually mean? /2

20) If you were to do this experiment over again, what would you do differently to improve your results and analysis? Give reasons. /2