##### Download the file titled Tractor Successes. It contains a scatter plot of the number of successes versus frequency. To compare the results to the Binomial Distribution, complete the following:

1. Explain why this tractor sales scenario can be a binomial experiment.
2. Using the Tractor Successes scatter plot, **construct a frequency distribution** for the number of successes. **X**
3. Compute the mean number of successes. The formula for the mean is as follows: **mean = 1.69 X**



The terms x represent the total number of successes (0, 1, 2, 3, 4) and f is the corresponding frequency (number of days where x successes occurred).

Explain what the numerical result means.X

1. From the frequency distribution, **construct the corresponding relative frequency distribution. X**

Explain why the relative frequency distribution table is a **probability distribution**. X

Then, use Excel to create a scatter plot of the **probability distribution**: **X**

Select the two columns of the probability distribution. Click on INSERT, and then go to the Charts area and select Scatter. Then choose the first Scatter chart (the one without lines connecting).

1. Using the frequency distribution, what is the tractor sales success average? **mean = 1.69.** In part 3, note that the numerator in the formula for the mean is the total number of successes. The total number of trials is the denominator of the formula for the mean multiplied by 4. What does this average mean? **X**
2. The Binomial Distribution is uniquely determined by n, the number of trials, and p, the probability of "success" on each trial. Using Excel, construct the Binomial Probability Distribution for four trials, n, and probability of success, p, as the tractor sales success average in part 5. Here is an explanation of the BINOM.DIST function in Excel: X [https://support.office.com/en-ie/article/BINOM-DIST-function-c5ae37b6-f39c-4be2-94c2-509a1480770c?ui=en-USrs=en-IEad=I](https://support.office.com/en-ie/article/BINOM-DIST-function-c5ae37b6-f39c-4be2-94c2-509a1480770c?ui=en-USrs=en-IEad=IE)

For example, In Excel

=BINOM.DIST(7,15,0.7, FALSE)

represents the probability of 7 successes out of 15 (n) trials. The 0.7 is the probability of success, p.

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Using the above value of n=4 with probability of success, p, as the tractor sales success average in part 5, what is the probability of at least two successes?

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P is 0.5 because it’s binomial probability which means 0.5 probability of success on every trial.

=BINOM.DIST(2, 4, 0.5, FALSE)

1. Using the formula for the mean of the Binomial Distribution, what is the mean number of successes in part 6 above? **X**
2. In Excel, create a scatter plot for the Binomial Distribution. The instructions for creating a scatter plot are in part 4 above.
3. Use the results above to compare the probability distribution of tractor sales successes and the Binomial Distribution. Compare the means in parts 4 and 6, too.

If the probability distribution of tractor sales successes and the Binomial Distribution differ, explain why that is so.

* Do you think the Binomial Distribution is a good model for the tractor sales success scenario? Why or why not? X
* How can International Tractor Motors use the Binomial Distribution to approximate tractor sales in similar countries?
* In what other scenarios can International Tractor Motors use the Binomial Distribution? Explain.

**Submit your Excel file in addition to your report.**

##### Requirements:

1. The paper must be written in third person.
2. Your paper should be four to five pages in length (counting the title page and references page) and cite and integrate at least one credible outside source. The [CSU Global Library](http://csuglobal.libguides.com/libraryhome) is a great place to find resources.
3. Include a title page, introduction, body, conclusion, and a reference page.
4. The introduction should describe or summarize the topic or problem. It might discuss the importance of the topic or how it affects you or society, or it might discuss or describe the unique terminology associated with the topic.
5. The body of your paper should answer the questions posed in the problem. Explain how you approached and answered the question or solved the problem, and, for each question, show all steps involved. Be sure the Word document is in paragraph format, not numbered answers like a homework assignment.
6. The conclusion should summarize your thoughts about what you have determined from the data and your analysis, often with a broader personal or societal perspective in mind. Nothing new should be introduced in the conclusion that was not previously discussed in the body paragraphs. Your conclusion should emanate from (be aligned with) your findings.
7. Include any tables of data or calculations, calculated values, and/or graphs associated with this problem in the body of your assignment.
8. Document formatting, citations, and style should conform to the [CSU Global Writing Center](http://csuglobal.libguides.com/apacitations). A short summary containing guidelines for paper formatting, citations, and references is contained in the [New Sample APA Paper](http://csuglobal.libguides.com/ld.php?content_id=21534702). In addition, information in the [CSU Global Library](http://csuglobal.libguides.com/c.php?g=207676p=3601840) has many helpful areas (Writing Center, Writing Tips, Template Examples/Papers Essays, and others).

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**Tractor Sales**

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MTH 410: Quantitative Business Analysis

Dr. Leslieann Humphreys

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**Introduction**

International Tractor Motors (ITM) launched a campaign to sell an IT-8 large specialty tractor in a country in Asia. ITM instructed 4 sales associates to sell the tractor across the country, with one associate assigned to each segment (East, West, North, and South). Regulations permitted an associate to only sell one tractor per day. The success or failure of an associate was indicated by a daily sale. For ITM this meant the company achieved success with its associates if they sold 4 tractors total each day.

**Number of Successes**

A probability distribution shows the probability of acquiring the values that a random variable, discrete or continuous, can have. A relative frequency distribution highlights the frequency proportion for each outcome (Manikandan, 2011). This distribution is a probability distribution because the probability is represented as the proportion and the random variable as the discrete outcome. The mean number of successes is 1.69. This indicates approximately 2 daily sales on average, occurring about 36% of the time.

**Binomial Experiment**

A binomial distribution computes probability for a binomial process or a Bernoulli process, if there is only one trial. In this process there are only two potential outcomes for a trial: success or failure, and the probability of success is constant for each trial. To have constant probability, the trials are independent (Holmes et al., 2018). A binomial experiment is an experiment which adheres to the tenets of a binomial process and must occur over a fixed number of trials (Holmes et al., 2018). The tractor sales can be understood as a binomial experiment because of the two possible outcomes, unchanging probability of success and established number of trials. For the binomial distribution, the average number of successes is 2. This is only slightly higher than the mean of the probability distribution. Likewise, the mean of the binomial probability is 0.014% greater than the mean of the probability distribution.

**Further Experimentation**

International Tractor Motors can employ the binomial distribution to investigate the unexamined variables of the campaign such as country regions and farm size. The success or failure in a particular region, for instance, West, or for a specific farm size such as medium, can be isolated and measured within a binomial experiment. If ITM aims to approximate the tractor sales in other Asian countries, region similarity as well as farm diversity may need to be taken into consideration.

**Conclusion**

The results of the binomial experiment for the IT-8 tractor campaign provided insight into the frequency of daily sales for the tractor throughout the country. ITM should not limit the measurement of success to sales by associate. Understanding the relationships between regions, farms, seasons, and sales may elucidate when ITM can expect tractor sales and why. Lastly, when conducting the experiment in similar countries, noting any differences can magnify any confounding variables.

**References**

Holmes, A., Illowsky, B., & Dean, S. (2018). Introductory business statistics. OpenStax.

Manikandan S. (2011). Frequency distribution. *Journal of pharmacology &*

*pharmacotherapeutics*, *2*(1), 54–56. https://doi.org/10.4103/0976-500X.77120