

MEASURES IN STATISTICS: THE MEAN, RANGE, AND VARIANCE

Below is a group discussion material. By doing these case studies, the students are expected to understand how the measures in statistics are applied in decision making. Except for the problems/questions concerning statistical/mathematical calculation, students may have different opinions about the suitable answers.

CASE #1

Mr. John is going to sell two of his businesses. Both are at the same price. You want to have a business and decide to buy only one of the businesses he has offered. You ask him which of the businesses makes more profit. Mr. John does not answer the question directly. Instead, he gives the sample net profits of each business. The samples are drawn from last year's monthly profit (in thousands dollars), as listed below:

Business A: 12 30 17 28 13 15 19 32 14 20

Business B: 30 27 10 20 17 33 22 28 10 23

In each list of samples above, the data are not sorted in chronological order.

Question #1: Based only on the samples of net profits, would you prefer Business A or B? What is your reason?

CASE #2

Instead of the sample data listed in Subcase #1, Mr. John gives the following data.

Business A: 12 40 17 28 3 15 19 2 14 50

Business B: 20 20 19 21 20 19 20 20 21 20

Question #2: In this case, which business would you prefer? What is your reason? Is Business A riskier than B?

Now, please refer to the following link to answer the next question.

<https://edcommstatistics.blogspot.com/2019/07/introduction-to-two-measures-in.html>

Question #3: Find the range of profits of each business in Case #2. Do the results support your preference in Case #2? What is your conclusion about the concept of range in statistics?

Is range a satisfying measure of data variability?

CASE #3

Still about buying a business from Mr. John in Case #1, consider the following sample net profits data of each business which he is selling.

Business A: 15 15 15 27 15 15 15 15 15 15

Business B: 15 20 12 10 14 20 20 12 19 20

Question #4: Which business is less risky? Why?

Question #5: Calculate the range of monthly net profit of the businesses. Do the results support your answer in Question #4?

Question #6: Referring to link mentioned above, calculate the sample variance of monthly net profit each business. Do the results support your answer in Question #4?

Question #7: Give your opinion about the pros and cons of using the range and variance as measures of variability.