Help in Determining the Results with the Best Precision

Let's imagine you have four measurements and you want to determine the three that give the best precision as determined by the average deviation (which we saw in the first lab),

$$Avg.\ Dev. \ = \ \frac{\sqrt{\sum_{i=1}^{N} (\bar{x} - x_i)^2}}{N}$$

where $\bar{x}$ is the average of the three trials you are using. With the following *sample data* you would need to take all of the possible combinations of trials and compute the average deviation.

Trial	1	2	3	4
Measurement	0.1320	0.1230	0.1311	0.1289

Here are the possible combinations of trials…

Set 1: 1,2,3
Set 2: 1,2,4
Set 3: 1,3,4
Set 4: 2,3,4

Now find the average deviation for Set1, Set2, Set3. and Set 4

Set 1: (0.1320, 0.1230, 0.1311) Avg. Deviation: 0.0038
Set 2: (0.1320, 0.1230, 0.1289) Avg. Deviation: 0.0033
Set 3: (0.1320, 0.1311, 0.1289) **Avg. Deviation: 0.0012**
Set 4: (0.1230, 0.1311, 0.1289) Avg. Deviation: 0.0031

Set 3 has the lowest deviation, so you would use those three trials to determine the average molarity of your solution. In this case that would be **0.1307 M**

In your work you will be selecting the best three of five trials. That results in ten combination sets. To help you, here are the possible combinations of trials:

Set 1: 1,2,3
Set 2: 1,2,4
Set 3: 1,2,5
Set 4: 1,3,4
Set 5: 1,3,5
Set 6: 1,4,5
Set 7: 2,3,4
Set 8: 2,3,5

Set 9: 2,4,5
Set 10: 3,4,5