

This book has permission to use the "N&K method of COLORS".

14) Question: The table shown below lists the weight of seeds in grams. The reading 0.950 is a mistake. If that data point is removed from the data set, which of the following choices will see the maximum change in its value?

- A) mean
- B) mode
- C) median
- D) range

nw,nc.

For speed, while solving something similar, only THINK the words in blue; WRITE only the words in other COLORS.

Weight of seeds
0.950
0.989
0.990
0.990
0.991
0.991
0.991
0.992
0.992
0.992
0.992
0.993
0.993
0.993
0.994
0.994
0.995

Given: 1) The table shown on the right lists the weight of seeds in grams.  
2) The reading 0.950 is a mistake.

Solve: If that data point (0.950), which is an outlier, is removed from the data set, which of the following choices will see the maximum change in its value?

Road Map of Solution:

The calculations on the RED . . . bracket side . . . . . include the outlier.  
The calculations on the GREEN bracket side do NOT include the outlier.

- First Step: Calculate "mean".
- Second Step: Calculate "mode".
- Third Step: Calculate "median".
- Fourth Step: Calculate "range".

First Step: Calculate "mean".

$$\text{Mean} = \frac{(1 \times 0.950) + (1 \times 0.989) + (2 \times 0.990) + (3 \times 0.991) + (4 \times 0.992) + (3 \times 0.993) + (2 \times 0.994) + (1 \times 0.995)}{1 + 1 + 2 + 3 + 4 + 3 + 2 + 1} = 0.990$$

$$\text{Mean} = \frac{(1 \times 0.989) + (2 \times 0.990) + (3 \times 0.991) + (4 \times 0.992) + (3 \times 0.993) + (2 \times 0.994) + (1 \times 0.995)}{1 + 2 + 3 + 4 + 3 + 2 + 1} = 0.992$$

Second Step: Calculate "mode".

Mode: It is the number that is repeated more often than any other.

So, 0.992 is the mode for this data set, since it is repeated 4 times.

The mode stays the same for this data set, whether the outlier (0.950) is included or excluded in the data set.

In a different data set, the mode may change, if an outlier were to be excluded.

Third Step: Calculate "median".

Median: The median is the middle value.

Since there are 17 rows in the data set, the . . . . . contents of the 9<sup>th</sup> row . . . . . will be the median.

Median: The median is the middle value.

Since there are 16 rows in the data set, the Sum of the contents of the 8<sup>th</sup> 9<sup>th</sup> row divided by 2, will be the median.

Fourth Step: Calculate "range".

$$\text{Range} = \text{MaxValue} - \text{MinValue} = 0.995 - 0.950 = 0.045$$

$$\text{Range} = \text{MaxValue} - \text{MinValue} = 0.995 - 0.989 = 0.006$$

	row #	Weight of seeds		
	17	0.950		OUTLIER
	16	0.989		
	15	0.990		
	14	0.990		
	13	0.991		
	12	0.991		
mean	0.990	11	0.991	0.992
mode	0.992	10	0.992	0.992
median	0.992	9	0.992	0.992
max	0.995	8	0.992	0.995
min	0.950	7	0.992	0.989
range	0.045	6	0.993	0.006
		5	0.993	
		4	0.993	
		3	0.994	
		2	0.994	
		1	0.995	