1

If M is a sequence of consecutive integers which contains more than 11 terms, what is the average of M?

Since M is a sequence of consecutive integers then M is an evenly spaced set, so its average equals to its median.

(1) In M, the number of terms that are less than 10 is equal to the number of terms greater than 21 --> consider the following set of consecutive integers {10, 11, 12, 13, 14, **15**, **16**, 17, 18, 19, 20, 21}. Now, if we place equal number of consecutive integers before 10 and after 21 then in any case the median would be the average of two middle numbers 15 and 16 so average=median=(15+16)/2=15.5. Sufficient.

(2) There are 20 terms in M. M can be any set of 20 consecutive integers. Not sufficient.

Answer: A.

2

Jerry bought 7 clothing items, including a coat, and the sum of the prices of these items was $365. If there was no sales tax on any clothing item with a price of less than $100 and a 7 percent sales tax on all other clothing items, what was the total sales tax on the 7 items that Jerry bought?

(1) The price of the coat was $125 --> so we know that there is a 7% tax on the coat. The sum of the prices of the remaining 6 items is $365-$125=$240. We don't know the breakdown of this sum between 6 items, so we can not calculate the total tax. Not sufficient.

To elaborate more: it's possible to have a sales tax on 0 items out of these 6 (for example if all 6 items are priced at $40), on 1 item out of these 6 (for example if the prices of 6 items are 120-24-24-24-24-24) or two items out of these 6 (for example if the prices of 6 items are 110-110-5-5-5-5).

(2) The average (arithmetic mean) price for the 6 items other than the coat was $40 --> The sum of the prices of these items is 6*$40=$240. The same info as above. Not sufficient.

(1)+(2) Nothing new. Not sufficient.

Answer: E.

3

Set X consists of seven consecutive integers, and set Y consists of nine consecutive integers. Is the median of the numbers in set X equal to the median of the numbers in set Y?

Sets X and Y are evenly spaced. In any evenly spaced set (aka arithmetic progression):
(mean) = (median) = (the average of the first and the last terms) and *(the sum of the elements) = (the mean) * (# of elements)*.

So the question asks whether *(mean of X) = (mean of Y)*?

(1) The sum of the numbers in set X is equal to the sum of the numbers in set Y --> *7*(mean of X) = 9* (mean of Y)* --> answer to the question will be YES in case*(mean of X) = (mean of Y) = 0* and will be NO in all other cases (for example *(mean of X) =9* and *(mean of Y) = 7*). Not sufficient.
For example consider following two sets:
Set X: {6, 7, 8, **9**, 10, 11, 12} --> sum 63;
Set Y: {3, 4, 5, 6, **7**, 8, 9, 10, 11} --> sum 63.

(2) The median of the numbers in set Y is 0 --> *(mean of Y) = 0*, insufficient as we know nothing about the mean of X, which may or may not be zero.

(1)+(2) Since from (2) *(mean of Y) = 0* and from (2) *7*(mean of X) = 9* (mean of Y)* then *(mean of X) = 0*. Sufficient.

Answer: C.

4

If the average (arithmetic mean) of 4 numbers is 30, how many of the numbers are greater than 30 ?

It's almost always better to express the average in terms of the sum: the average of 4 numbers is 30 --> the sum of 4 numbers is 4*30=120

(1) Two of the numbers are equal to 20 --> the sum of the other two numbers is 120-2*20=80. Now, if both of them are 40 then there are two numbers greater than 30 but if one number is 25 and another is 55 then there is only one number greater than 30. Not sufficient.

(2) None of the numbers are equal to 30. Clearly insufficient.

(1)+(2) Example from (1) is still valid, so we still have two answers. Not sufficient.

Answer: E.

5

Answer to the question is A, but you shouldn't divide the "sum" by 2, you should divide by n.

$Weighted\ average=\frac{sum\ of\ weights}{\#\ of\ data\ points}$, or in our case $average\ height=\frac{sum\ of\ heights}{\#\ of\ people}$.

(1) The average height of $\frac{n}{3}$ people is 74.5 inches and the average height of $\frac{2n}{3}$ people (the res of the people in the group $n-\frac{n}{3}=\frac{2n}{3}$) is 70 inches --> $average\ height=\frac{sum\ of\ heights}{\#\ of\ people}=\frac{74.5*\frac{n}{3}+70*\frac{2n}{3}}{n}$ --> n cancels out --> $average\ height=74.5*\frac{1}{3}+70*\frac{2}{3}$. Sufficient.

(2) Sum of heights equals to 178 feet 9 inches --> only nominator is given. Not sufficient.

Answer: A.