



GMAT

Quant Section Test [RANGE, SD & ND] - Solutions

1. Solution:

Topic: Data Analysis

Concept Tested: Properties of Standard Deviation

Type of Question: Data Sufficiency (DS)

Given:

M is a set of integers.

i.e.,

$$M = \{ \dots -3, -2, -1, 0, 1, 2, 3 \dots \}$$

Question:

Standard deviation of set M ?

Approach: Properties of Standard deviation.

Statement I is insufficient:

Median of set M is 15.

We know only the median. We don't know any other information.

Therefore, Statement I by itself is insufficient to answer the question asked.

So, eliminate A and D.

The answer will be either B, C or E.

Statement II is sufficient:

Set M is consecutive and it contains 29 terms.

Standard deviation is nothing but how each and every value is spread away from the mean.

Here it is given "M" is consecutive integer set and it has 29 terms.

Of-course it is sufficient. Because we know both the number of terms and the spread.

For consecutive list, MEAN = MEDIAN.

So here

If "X" is the Mean

Then,

$$X-14, X-13, X-12, X-11, \dots, X-1, X, X+1, \dots, X+13, X+14.$$

As we subtract each and every element with X, we can get the spread of each values (standard deviation).

Therefore, Statement II by itself is sufficient to answer the question asked.

So, eliminate C and E.

Hence, the answer is B.

2. Solution:

Topic: Data Analysis

Concept Tested: Range

Type of Question: Data Sufficiency (DS)

Given:

A certain college conducted a survey on 200 students heights.

Question:

Was the range of the surveyed heights for these students greater than 40cms?

Approach: Definition of Range.

Range = Maximum Value – Minimum Value.

Statement I is insufficient:

120 students' heights were between 130cms to 160cms

We don't know anything about the 80 students.

Therefore, Statement I by itself is insufficient to answer the question asked.

So, eliminate A and D.

The answer will be either B, C or E.

Statement II is insufficient:

80 students' heights were between 165cms and 180cms.

Again, we don't know anything about the 120 students.

Therefore, Statement II by itself is insufficient to answer the question asked.

So, eliminate B.

The answer will be either C or E.

Combine both Statements:

We just know the range of 120 students and 80 students, so we can't say whether combined range is greater 40 cms.

For example,

If from Statement I, 120 students least height start from 155cms,

And if from statement II, 80 students greatest height is 170 cms.

Then the range of 200 students = $170 - 155 = 15$. Answer to the question is NO.

OR

For example,

If from Statement I, 120 students least height start from 132cms,

And if from statement II, 80 students greatest height is 175 cms.

Then the range of 200 students = $175 - 132 = 43$. Now answer to the question is YES.

Therefore, even after combining two statements, it is insufficient to answer the question asked.

So, eliminate C.

Hence, the answer is E.

3. Solution:

Topic: Data Analysis

Concept Tested: Normal Distribution

Type of Question: Data Sufficiency (DS)

Given:

Number of apples ate by 100000 children is normally distributed.

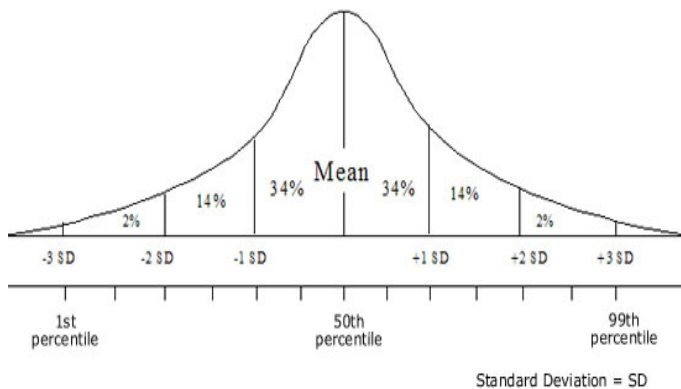
Question:

Approximately how many of the surveyed children ate more than 50 chocolates during the course of the year?

Approach:

Use the Basic properties of Normal curve.

Normal curve is distributed as shown below in the figure.



Statement I is insufficient:

Mean number of chocolates ate by children during the course of the year is 40.

We know only the mean. We need to know the standard deviation.

Therefore, Statement I by itself is insufficient to answer the question asked.

So, eliminate A and D.

The answer will be either B, C or E.

Statement II is insufficient:

There was a standard deviation of 5 chocolates eaten by each child.

We know only the standard deviation. But we don't know the mean.

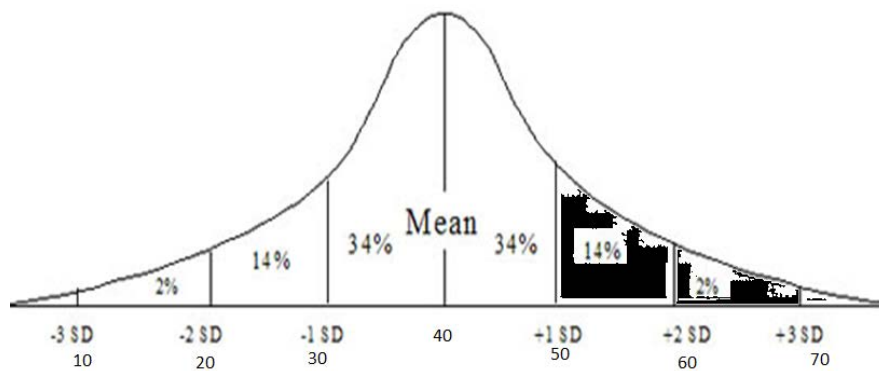
Therefore, Statement II by itself is insufficient to answer the question asked.

So, eliminate B.

The answer will be either C or E.

Combine both Statements:

We know both Mean and standard deviation.



We can clearly see that,

16% of the children ate more than 50 apples.

So 16% of 100000 = 16000.

Therefore, combining the statements I and II is sufficient to answer the question asked.

So, eliminate E.

Hence, the answer is C.

4. Solution:

Topic: Data Analysis

Concept Tested: Range (Maxima and Minima)

Type of Question: Problem Solving (PS)

Given:

Median = 8(Middle most term)

Number of Elements = 15

Range = 20

i.e.,

Maximum value – Minimum Value = 20

Question:

Least possible integer that could be in this set?

Approach:

Maximization or minimization.

Here we need to find the least possible value.

Let's try to minimize all the value greater than the median, so we get the least possible value.

Median position is the 8th position,

So, there are 7 values above and below the median.

$X_1, X_2, X_3, X_4, X_5, X_6, X_7$ Median(8), $X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}$

Since they have said different integers,

Least value for X_8 to X_{15} will be consecutive integers more than 8.

$X_1, X_2, X_3, X_4, X_5, X_6, X_7$ Median(8), 9, 10, 11, 12, 13, 14, 15

We need to X_1 Least value?

We know that,

Maximum value – Minimum Value = 20

15 - Minimum Value = 20

Minimum Value = -5

Hence, the answer is E.

5. Solution:

Topic: Statistics

Concept Tested: Normal Distribution

Type of Question: Problem Solving (PS)

Given:

Total = 600 students

Mean = 60

Twelve students receive greater than or equal to 96.

i.e.,

2% of the entire total number of students.

Also given that, bottom 16% of the students fails the test.

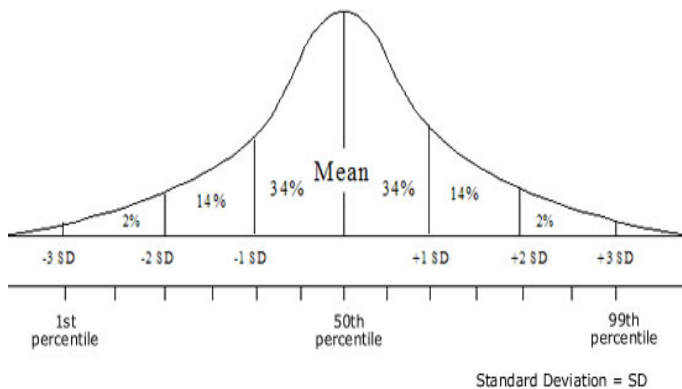
Question:

Scores at or below which students have failed the test?

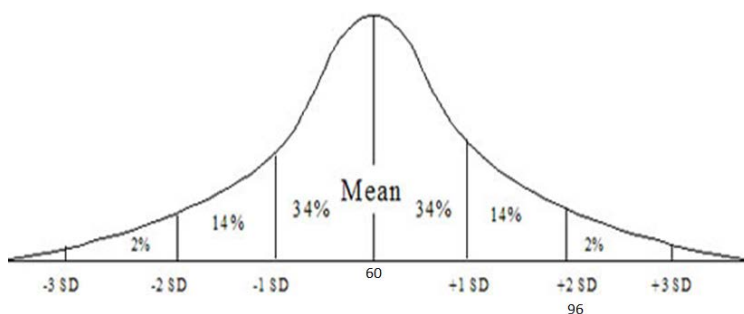
Approach:

Use the Basic properties of Normal curve.

Normal curve is distributed as shown below in the figure.



Twelve students receive greater than or equal to 96.

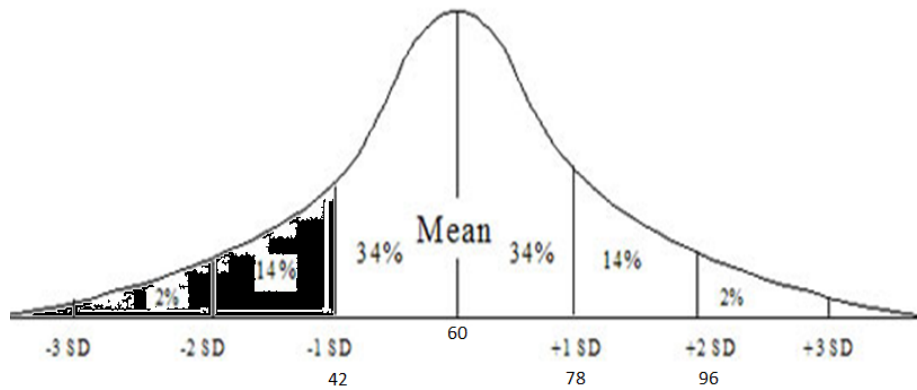


We can see that from the above figure,

$$2 \text{ SD} = 36$$

$$\text{SD} = 18.$$

So,



Given that bottom 16% fail the test,

We can see from the above diagram, they will start failing at the score of 42.

Hence, the answer is A.

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