

Visual Basic Functions for Natural Resource Programming

By David R. Larsen

Lesson 3

Objectives:

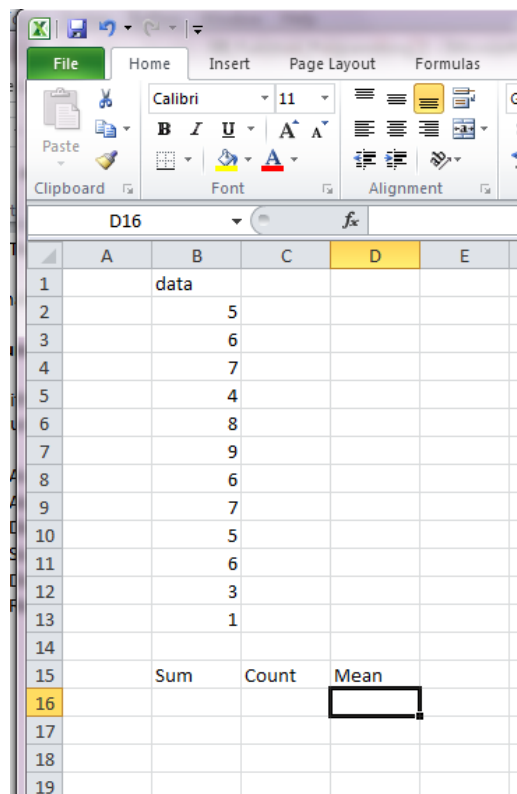
In this lesson we will learn:

- Learn to program a quadratic mean function.
- Learn some basic syntax.
- Learn to square numbers.
- Learn to take the square root of numbers in VBA
- Learn to run the function we just made.

Please refer to the previous lessons for detail not described here.

Quadratic Mean function

Let's calculate a quadratic mean in the spreadsheet, first we have a column of data:



| | A | B | C | D | E |
|----|---|------|-------|------|---|
| 1 | | data | | | |
| 2 | | 5 | | | |
| 3 | | 6 | | | |
| 4 | | 7 | | | |
| 5 | | 4 | | | |
| 6 | | 8 | | | |
| 7 | | 9 | | | |
| 8 | | 6 | | | |
| 9 | | 7 | | | |
| 10 | | 5 | | | |
| 11 | | 6 | | | |
| 12 | | 3 | | | |
| 13 | | 1 | | | |
| 14 | | | | | |
| 15 | | Sum | Count | Mean | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |

Figure 1. A screenshot of a data set entered into Microsoft Excel.

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Then we create a column of squared numbers.

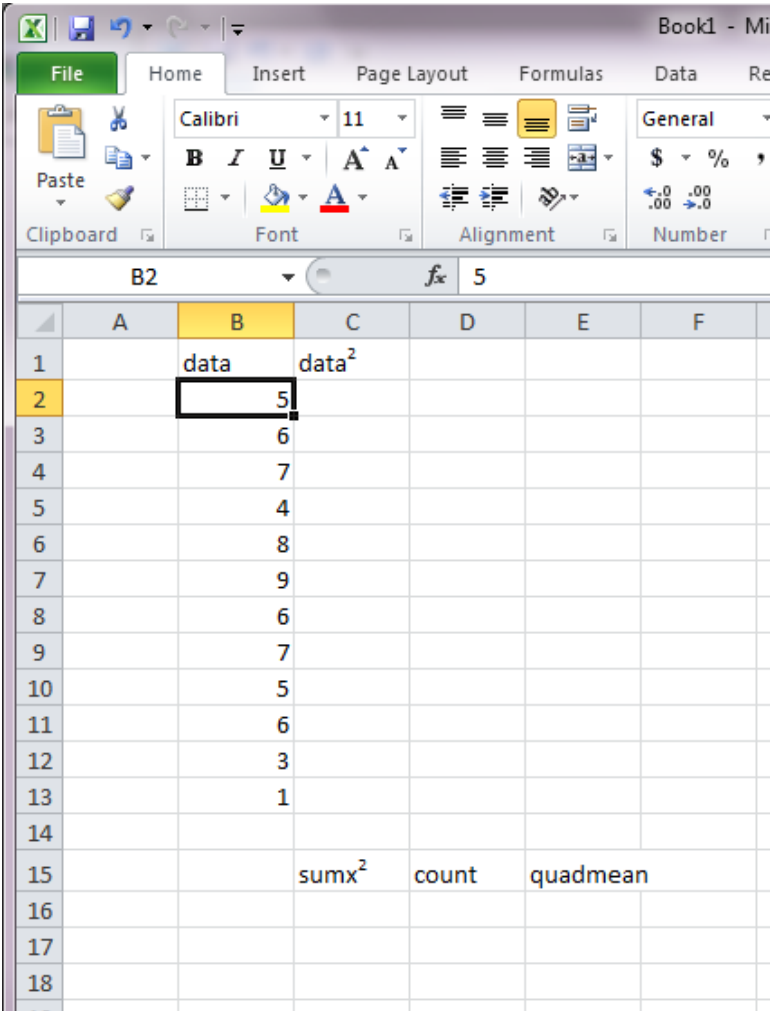


Figure 2. we create a data squared column.



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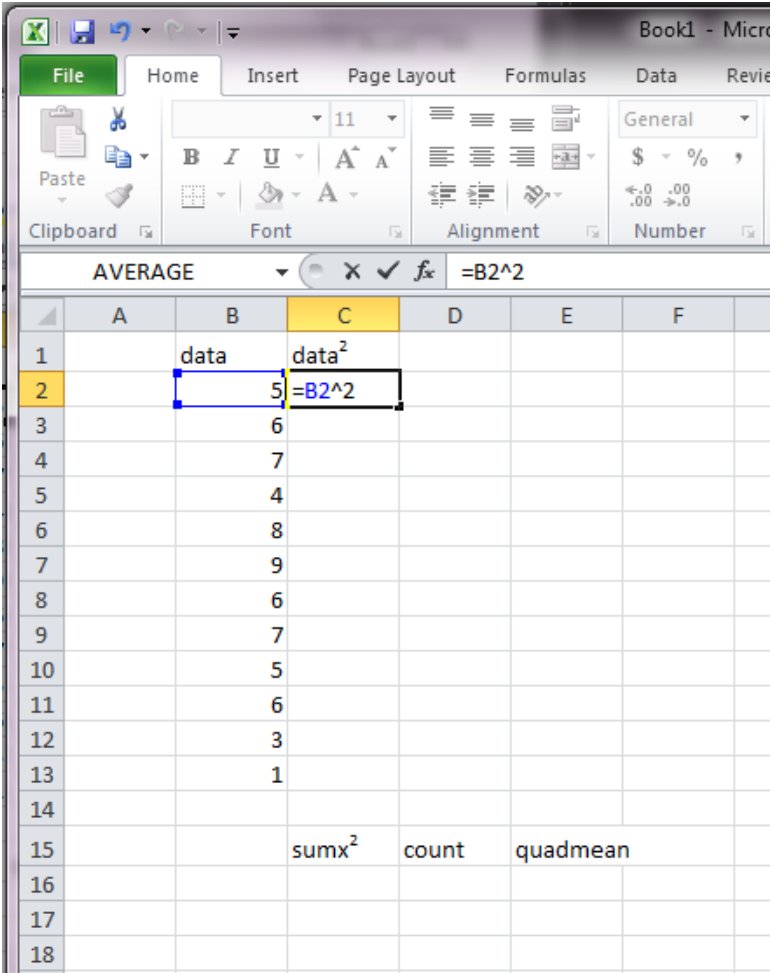


Figure 3. The formula for the data squared column.



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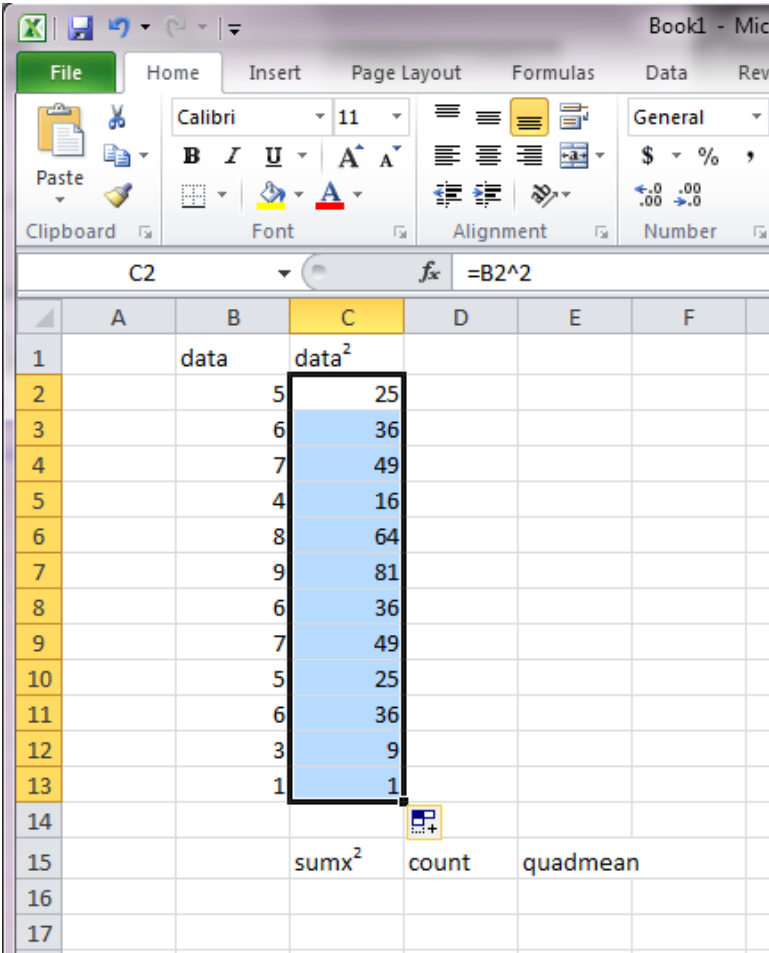


Figure 4. The results of the formula copied down the column.



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Then we divide the sum by the count.

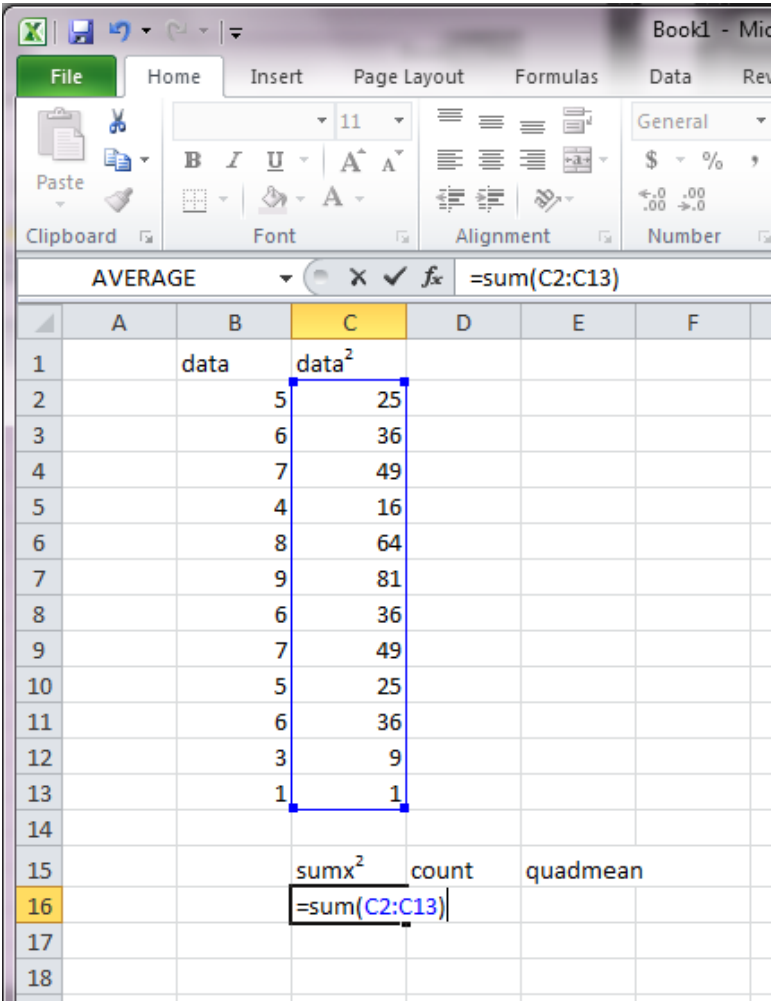


Figure 5. Sum the squared data column.



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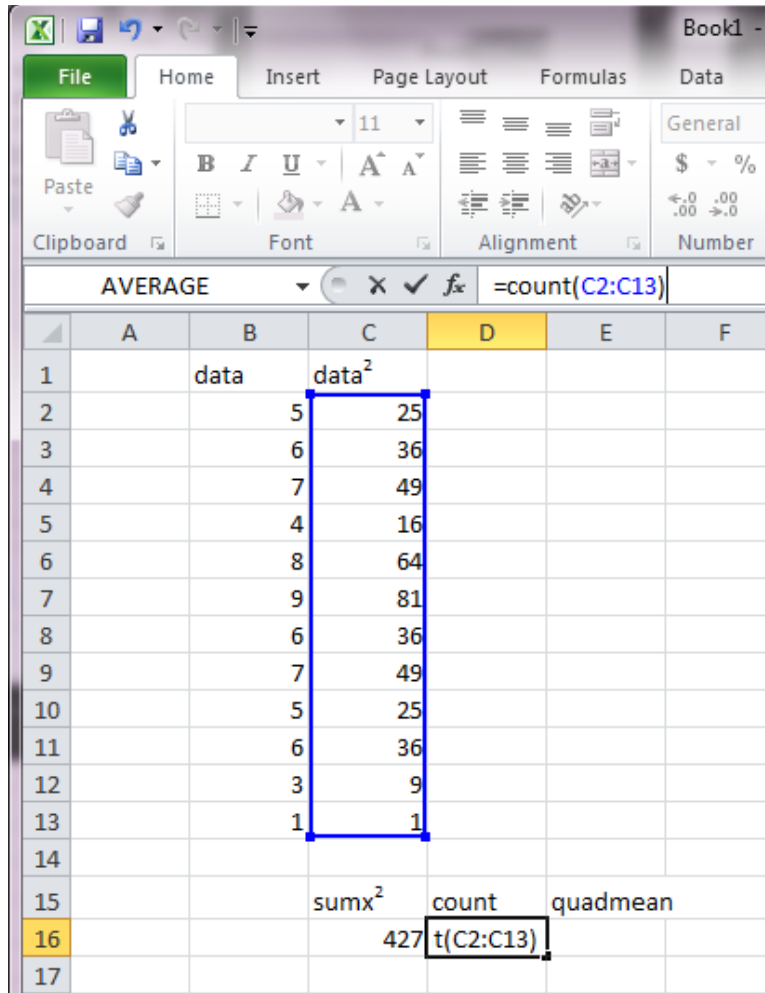


Figure 6. Count the data squared column.

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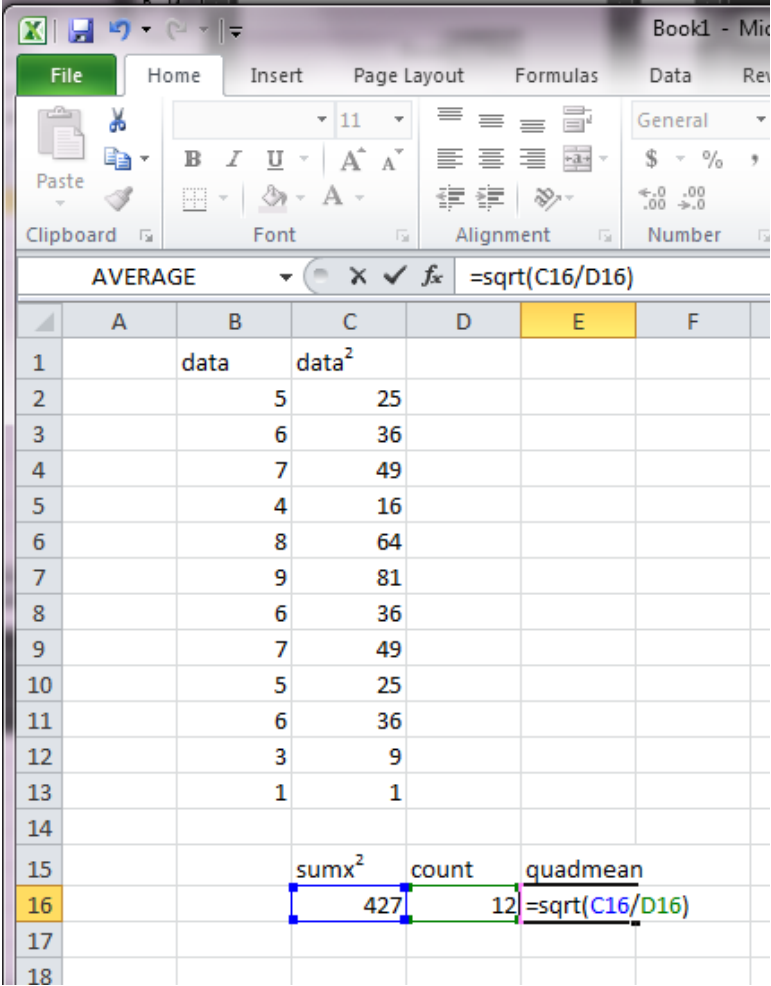


Figure 7. Calculate the quadratic mean value with this formula.



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Programming the Function

I start with a mean function we created in lesson 2.

- Accept a range of double numbers as an argument returning a single number.
- Add appropriate comments.
- Determine the length of the range of numbers.
- Sum the squared range of number.
- Divide the sum by length.
- Take the square root of the result.
- Return the answer as a number of type single.

During these tutorials, I will give you short examples to help you learn the process. I will only give examples on items that are new, please refer to previous lessons for steps already covered.

In a Module window type

```
Function quadmean(data As Range) As Single
```

Please reuse your code from the mean example as the function is very similar.

In the **For loop**, replace the mean statement with the following statement.

```
quadmean = quadmean + (data.Item(i) * data.Item(i))
```

this statement says assign a new value to the variable quadmean based on the old value of quadmean + the value of data at item I squared, by the time that this loop gets to data.Count the value of quadmean would equal the sum command in the excel example .

Outside the loop change the statement to the following.

```
quadmean = Math.Sqrt(quadmean / data.Count)
```

This statement says that the new value of quadmean equals the square root of the old value of quadmean divided by data.Count just as we did in the spreadsheet.

Now remember that the variable quadmean is returned to the spreadsheet. My actual working code need only 5 line of instructions.



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Now we will use the new mean function.

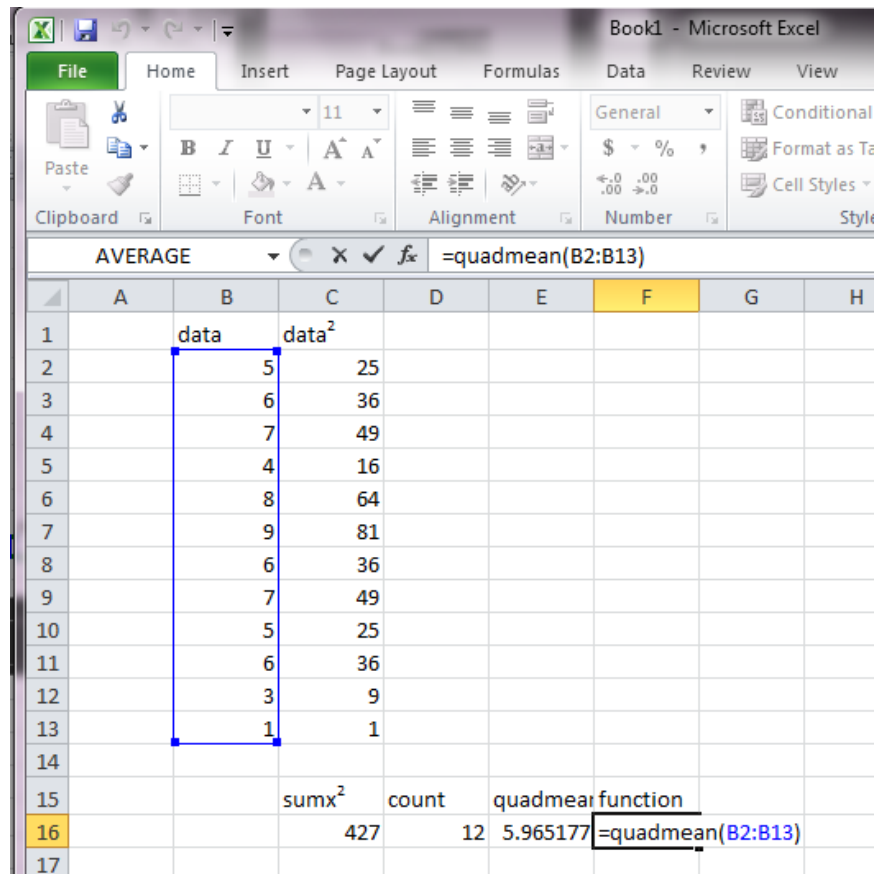


Figure 8. Enter the quadmean function and the range.

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And here is the result of the function.

| | A | B | C | D | E | F | G |
|----|---|------|-------------------|-------|-------------------|----------|---|
| 1 | | data | data ² | | | | |
| 2 | | 5 | 25 | | | | |
| 3 | | 6 | 36 | | | | |
| 4 | | 7 | 49 | | | | |
| 5 | | 4 | 16 | | | | |
| 6 | | 8 | 64 | | | | |
| 7 | | 9 | 81 | | | | |
| 8 | | 6 | 36 | | | | |
| 9 | | 7 | 49 | | | | |
| 10 | | 5 | 25 | | | | |
| 11 | | 6 | 36 | | | | |
| 12 | | 3 | 9 | | | | |
| 13 | | 1 | 1 | | | | |
| 14 | | | | | | | |
| 15 | | | sumx ² | count | quadmean function | | |
| 16 | | | 427 | 12 | 5.965177 | 5.965177 | |
| 17 | | | | | | | |

Figure 9. The results of the quadmean function.

In this lesson we have learn:

- Learn to program a quadratic mean function.
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Please write the quadmean function the works. Copy and paste the VBA commands into a document be sure your name is in the comments and send that to the Blackboard drop box.