

Quadratic and cubic regression in Excel



FaleASuaLingua

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I have the following information:

| Height | Weight |
|--------|--------|
| 170 | 65 |
| 167 | 55 |
| 189 | 85 |
| 175 | 70 |
| 166 | 55 |
| 174 | 55 |
| 169 | 69 |
| 170 | 58 |
| 184 | 84 |
| 161 | 56 |
| 170 | 75 |
| 182 | 68 |
| 167 | 51 |
| 187 | 85 |
| 178 | 62 |
| 173 | 60 |
| 172 | 68 |
| 178 | 55 |
| 175 | 65 |
| 176 | 70 |

I want to construct quadratic and cubic regression analysis in Excel. I know how to do it by linear regression in Excel, but what about quadratic and cubic? I have searched a lot of resources, but could not find anything helpful.

[excel](#) [regression](#)

edited Jun 2 '12 at 14:51



Bart

14.2k ● 6 ● 34 ● 58

asked



2 my 1st google result for "excel polynomial regression" is people.stfx.ca/bliengme/ExcelTips/Polynomial.htm - what's wrong with that?!? – [Aprillion](#) Jun 1 '12 at 22:28

@deathApril I suggest you add this as the answer – [brettdj](#) Jun 2 '12 at 10:42

@deathApril i've been googling for a how to perform polynomial regressions in Excel. i already found the link you mention; but i don't think it includes anything to do with quadratic or 4th order regressions. i could be wrong: it's horribly written. – [Ian Boyd](#) Sep 2 '12 at 20:19

3 Answers

You need to use an undocumented trick with Excel's `LINEST` function:

```
=LINEST(known_y's, [known_x's], [const], [stats])
```

Background

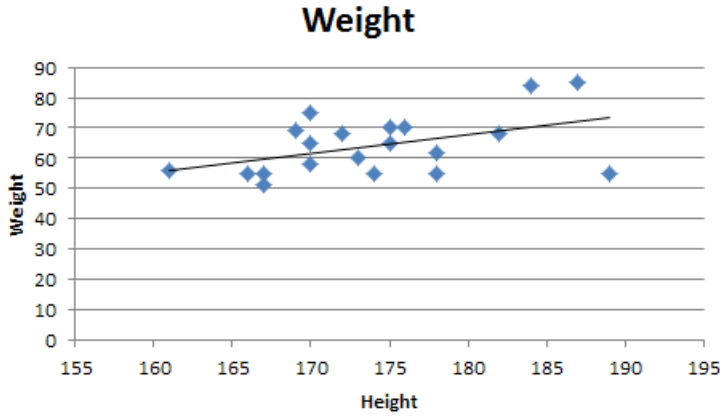
A regular *linear* regression is calculated (with your data) as:

```
=LINEST(B2:B21,A2:A21)
```

which returns a single value, the linear slope (m) according to the formula:

$$y = m \times x + b$$

which for your data:



is:

$$y = 0.619033398038923 \times x + b$$

Undocumented trick Number 1

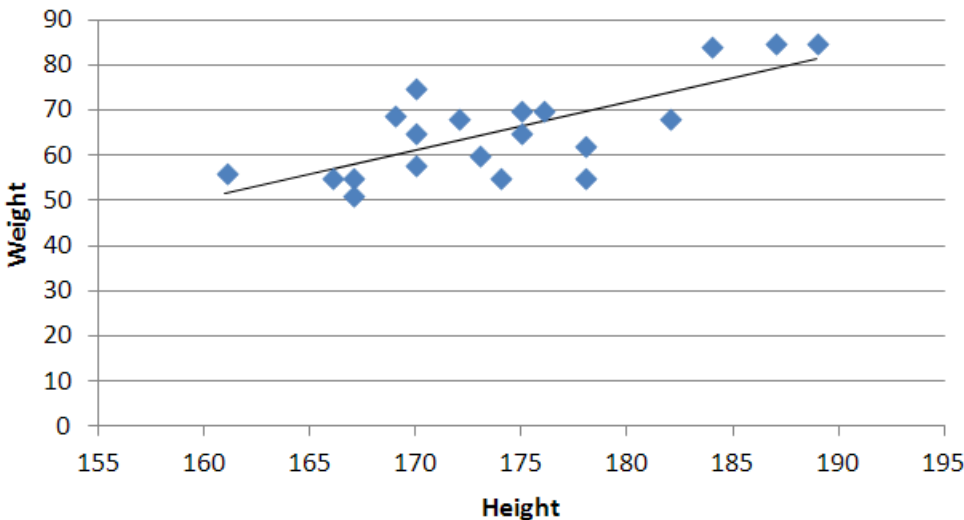
You can also use Excel to calculate a regression with a formula that uses an exponent for x different from 1, e.g. $x^{1.2}$:

$$y = m \times x^{1.2} + b$$

using the formula:

```
=LINEST(B2:B21, A2:A21^1.2)
```

which for you data:



is:

$$y = 0.315374680721405 \times x^{1.2} + b$$

You're not limited to one exponent

Excel's `LINEST` function can also calculate multiple regressions, with different exponents on `x` at the same time, e.g.:

```
=LINEST(B2:B21,A2:A21^{1,2})
```

Note: if locale is set to European (decimal symbol ","), then comma should be replaced by semicolon and backslash, i.e. `=LINEST(B2:B21;A2:A21^{1\2})`

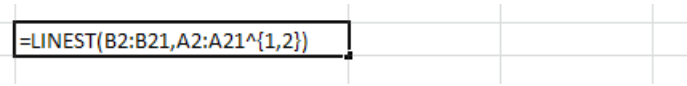
Now Excel will calculate regressions using both x^1 and x^2 at the same time:

$$y = m_1x^1 + m_2x^2 + b$$

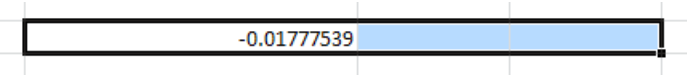
How to actually do it

The impossibly tricky part there's no obvious way to see the other regression values. In order to do that you need to:

- select the cell that contains your formula:

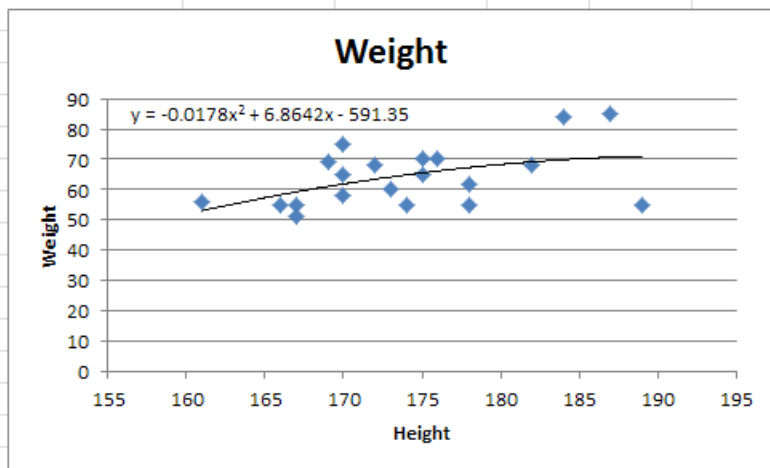


- extend the selection the left 2 spaces (you need the select to be at least 3 cells wide):



- press `F2`
- press `Ctrl + Shift + Enter`

| | | |
|-------------|-------------|--------------|
| -0.01777539 | 6.864151123 | -591.3531443 |
|-------------|-------------|--------------|



You will now see your 3 regression constants:

```
y = -0.01777539x^2 + 6.864151123x + -591.3531443
```

Bonus Chatter