By putting the values *D*n (***x***) against n on a table, a final relationship between the two can be found.

|  |  |
| --- | --- |
| n | Maximum deviation |
| 1 | 1 |
| 2 | 0.5 |
| 3 | 0.25 |
| 4 | 0.125 |
| 5 | 0.0625 |
| 6 | 0.03125 |
| 7 | 0.015625 |

Through trial and error, the value of the maximum deviation for n was found to be 21 - n .

This can be proven by finding the point at which P’n(***x***) is equal to zero, and then finding P”n(***x***). If that value is less than zero, than the stationary point found in P’n(***x***) is the maximum point. That value can then be transposed into Pn(***x***) to find the maximum deviation for n.

For example:

The polynomial:

fn(***x***) = -2***x****­*2 + n***x*** - 7

Through trial and error, can be found to have the relationship between n and the maximum of:

- 7

To prove this the first derivative can be found:

fn’(***x***) = -4***x****­*+ n

The first derivative has a stationary point when fn’(***x***) = 0, hence:

0 = -4***x*** + n

X =

The second derivative can then be found:

fn”(***x***) = - 4

fn”(***x***) < 0

And as fn”(***x***) is less than zero, X = is a maximum.

X = can then be transposed into fn(***x***) to find the relationship between n and the maximum:

fn() = - *­*2 + n - 7

= - *­*+ - 7

= - 7 , as required