A prime producing quadratic expression.

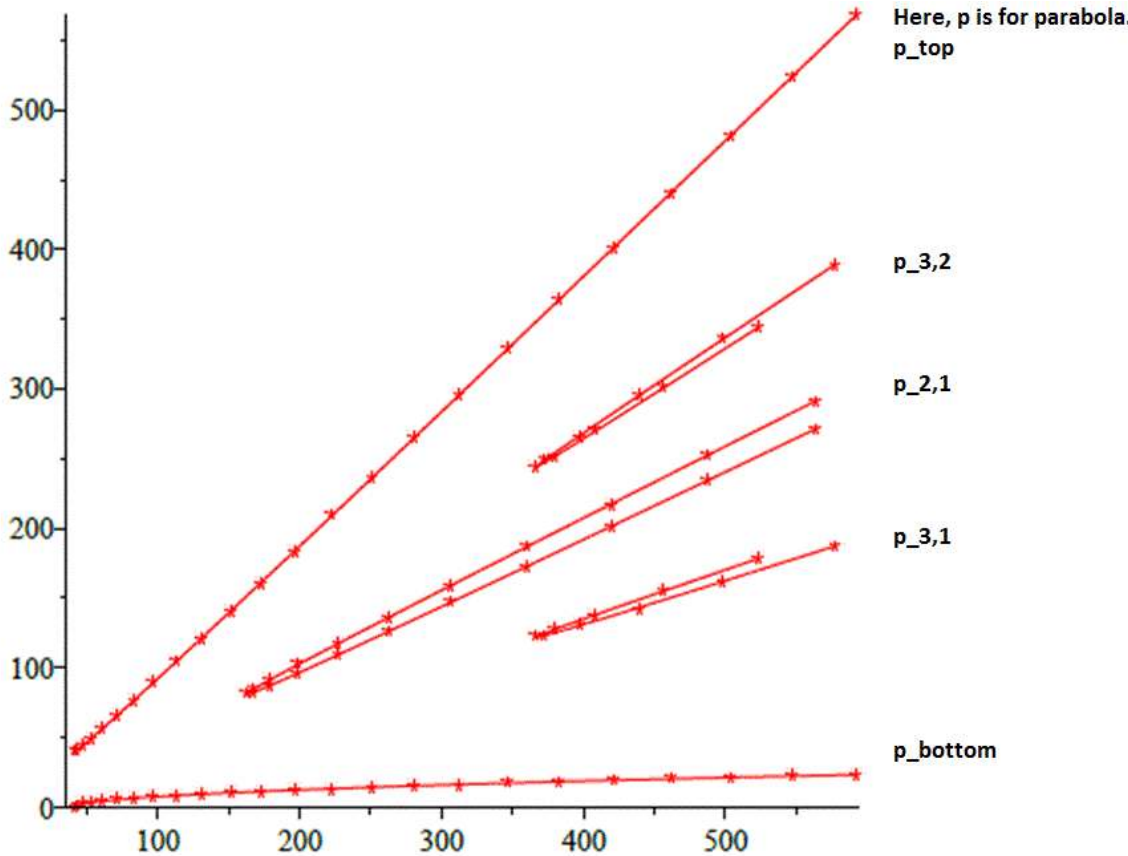
An exploration on the trinomial f(n) = n^2 + n + 41. Where n is a non-negative integer.

Apparently, all cases where f(n) is a composite number can be listed systematically.

Maple Code for exact curve fit parabolas. Parabolas are described parametrically.

```
> x[1, 1, bottom] := z^2+z+41; y[1, 1] := z;

> p2 := plot([x[1, 1, bottom], y[1, 1], z = 0 .. 20]);

> with(plots);

> display(p2);

>

> x[1, 1, top] := z^2+z+41; y[1, 1, top] := z^2+40;

> p3 := plot([x[1, 1, top], y[1, 1, top], z = 0 .. 20]);

> display(p3);

>

> y[2, 1] := 2*z^2+z+81; x[2, 1] := 4*z^2+163;

> p4 := plot([x[2, 1], y[2, 1], z = -10 .. 10]);

> display(p4);

>

> y[3, 1] := 3*z^2+2*z+122; x[3, 1] := 9*z^2+3*z+367;

> p5 := plot([x[3, 1], y[3, 1], z = -4 .. 3]);

>

> y[3, 2] := 6*z^2+z+244; x[3, 2] := 9*z^2+3*z+367;

> p6 := plot([x[3, 2], y[3, 2], z = -4 .. 3]);
```

Now see plot on next page

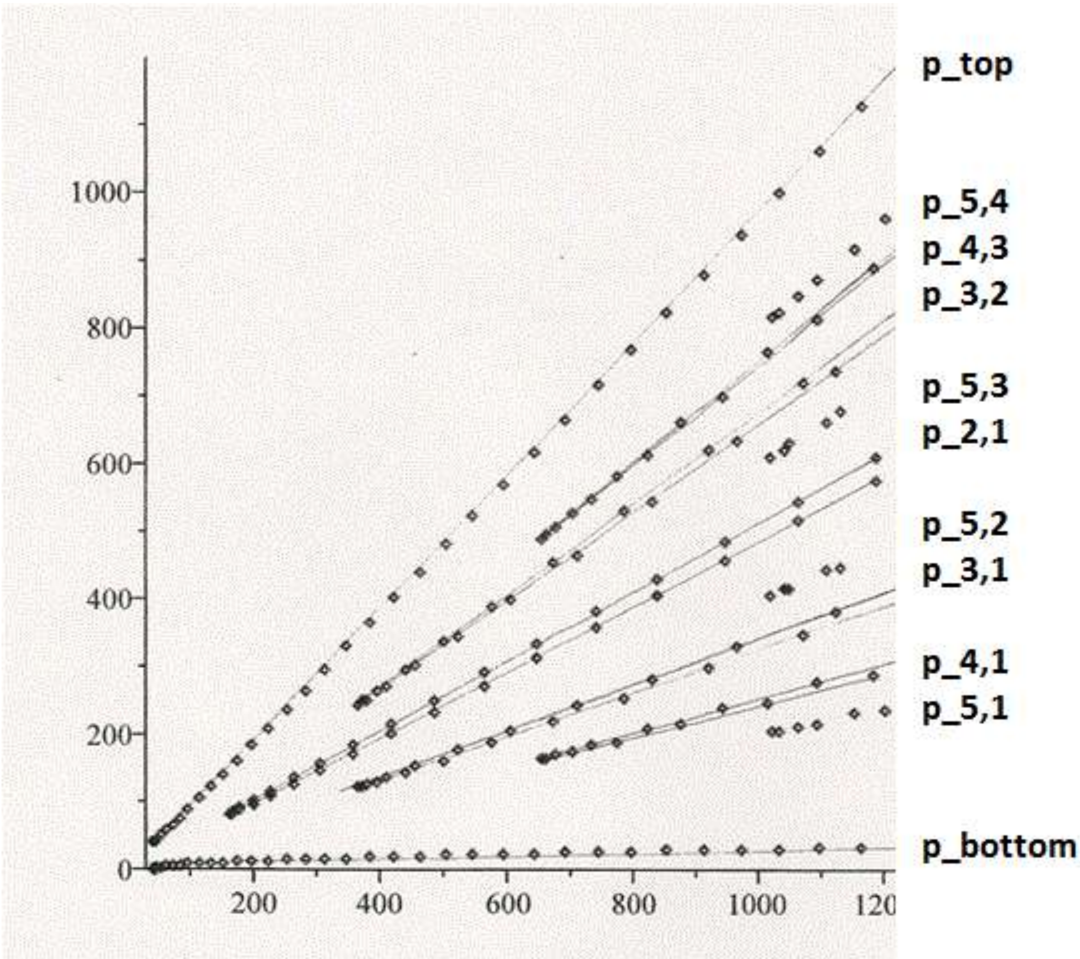


Data points of $y^2+y+41 \equiv 0 \ mod \ x$. Also, parabolic exact curve fit of this data.

Rules for naming parabolas

p_r,c with p for parabola, r for row and c for column. Require that r and c are positive integers. Also, 0<r<c and gcd(r,c) = 1. Where gcd stands for greatest common divisor. Also, the count of the number of c parabolas for a given r is Euler's phi function phi(r). This enumerates as phi(r) = 1,2,2,4,2, … see oeis.org/A10.

Here is a zoomed out view of the same graph.



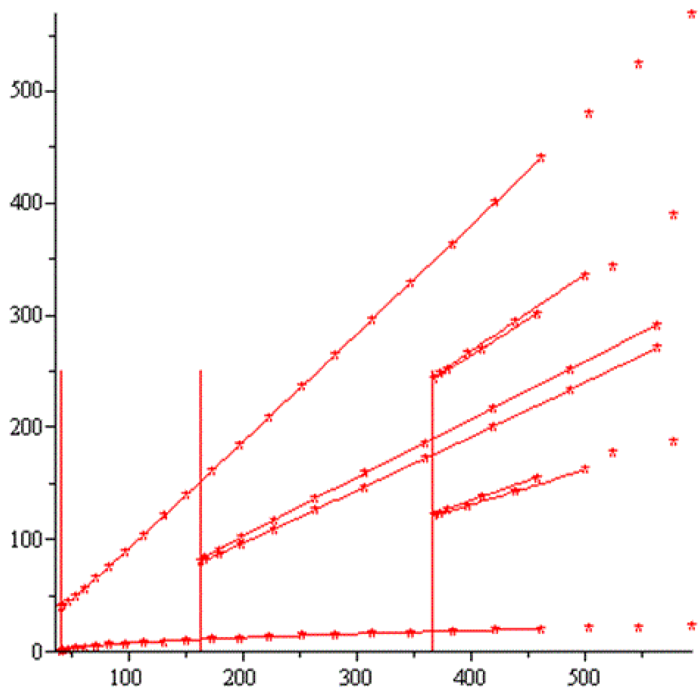
y^2+y+41 mod x is congruent to 0.

Horizontal minimum of parabolas (not including p_top and p_bottom) is 163*(x^2)/4. For some reason, the parabolas line up. Such is the nature of the integers.

A prime producing polynomial graph again with more analysis.

Graph of divisibility

Vertical lines at 163*n^2/4



Notice the vertical lines are tangent to the parabolas.

See that 163*1/4 = 40.75. And, 163*(2^2)/4 = 163. And 163*(3^2)/4 = 366.75. So we have 3 vertical lines. The x minimum of the curve fit graphs line up exactly with the vertical lines. The parabolas are tangent there.