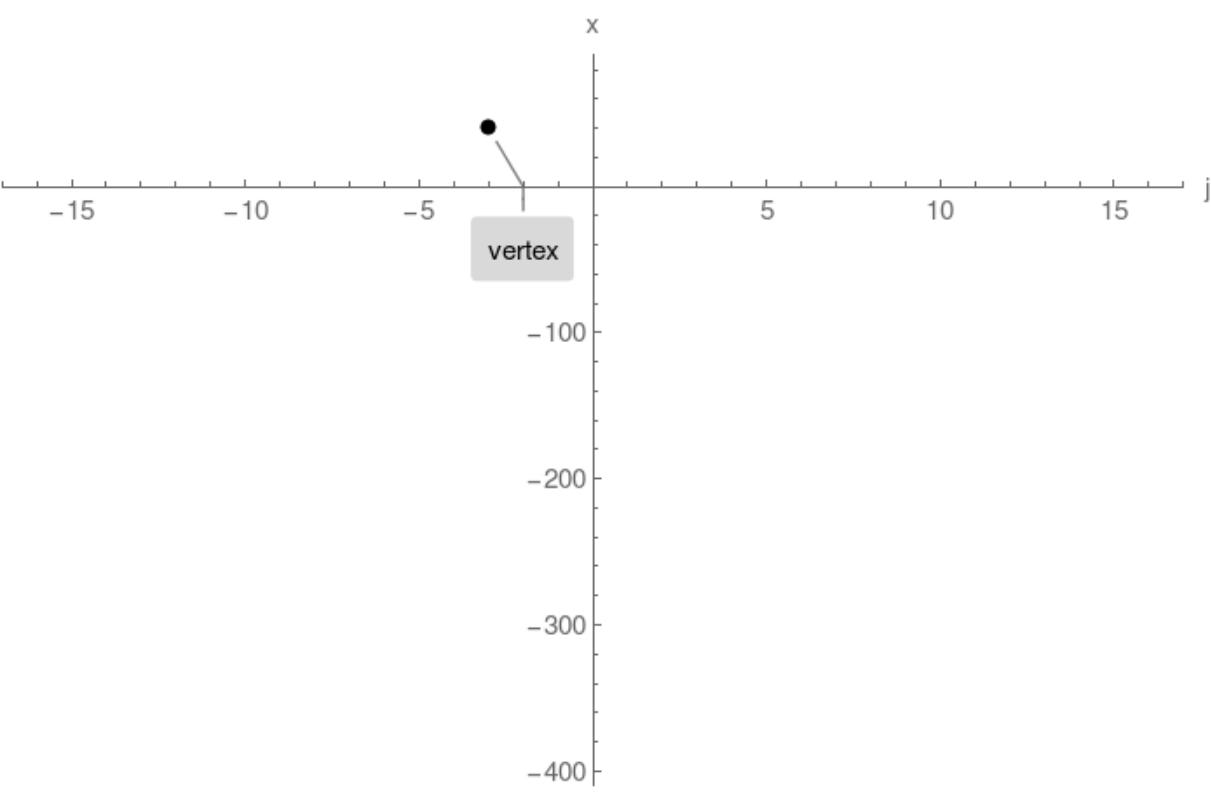
Example 1. 2 horizontal intercepts found

Plot $x(j) = -j^2 - 6j + 31$

Step 1.

Compute vertex and plot single point:

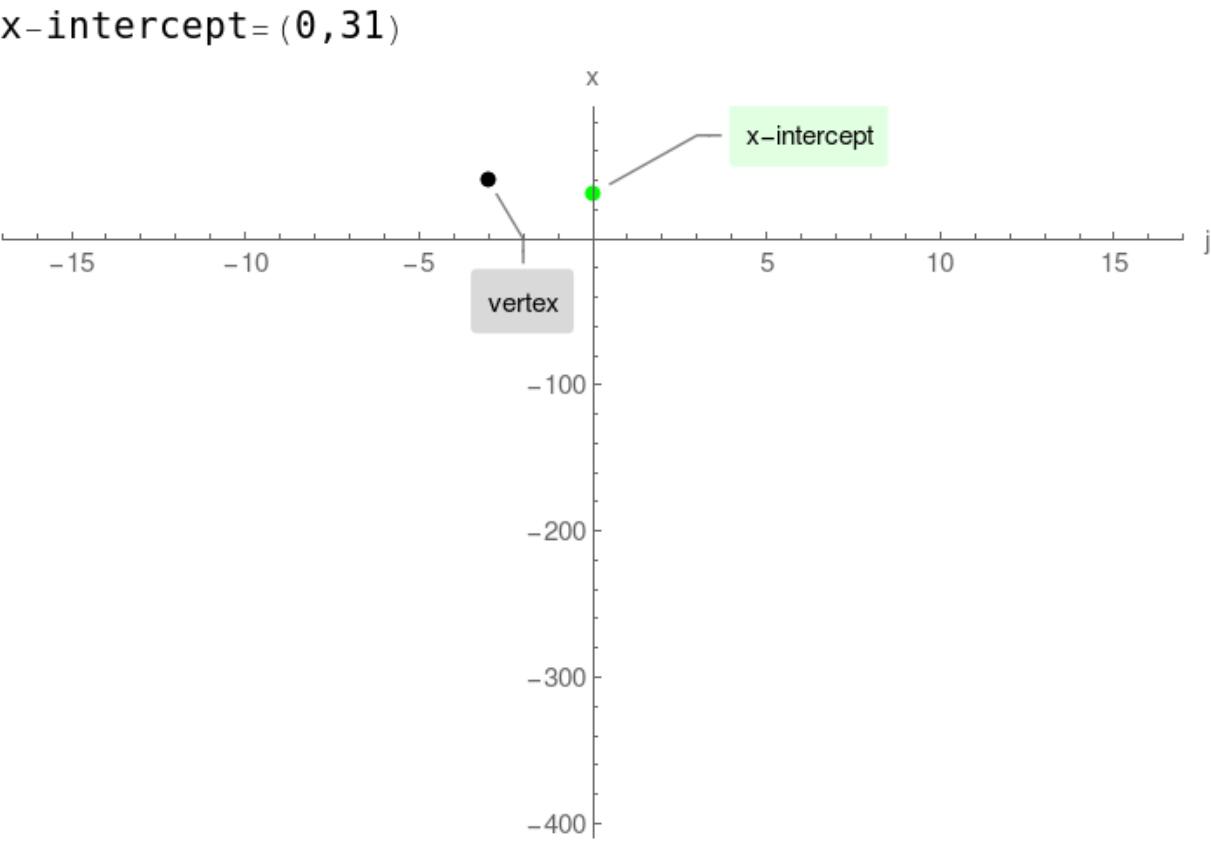
vertex $= (-3, 40)$



Step 2.

Compute x-intercept and plot single point:

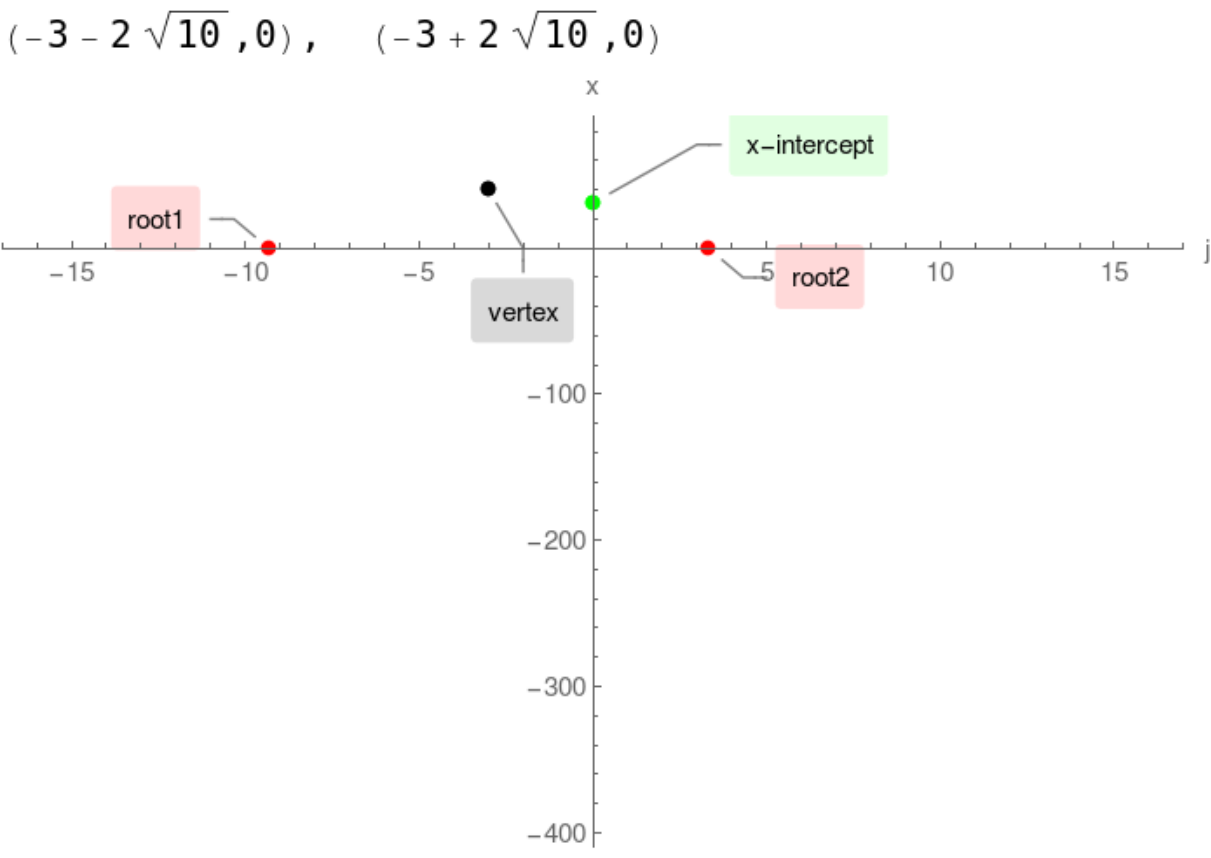
x-intercept $= (0, 31)$



Step 3.

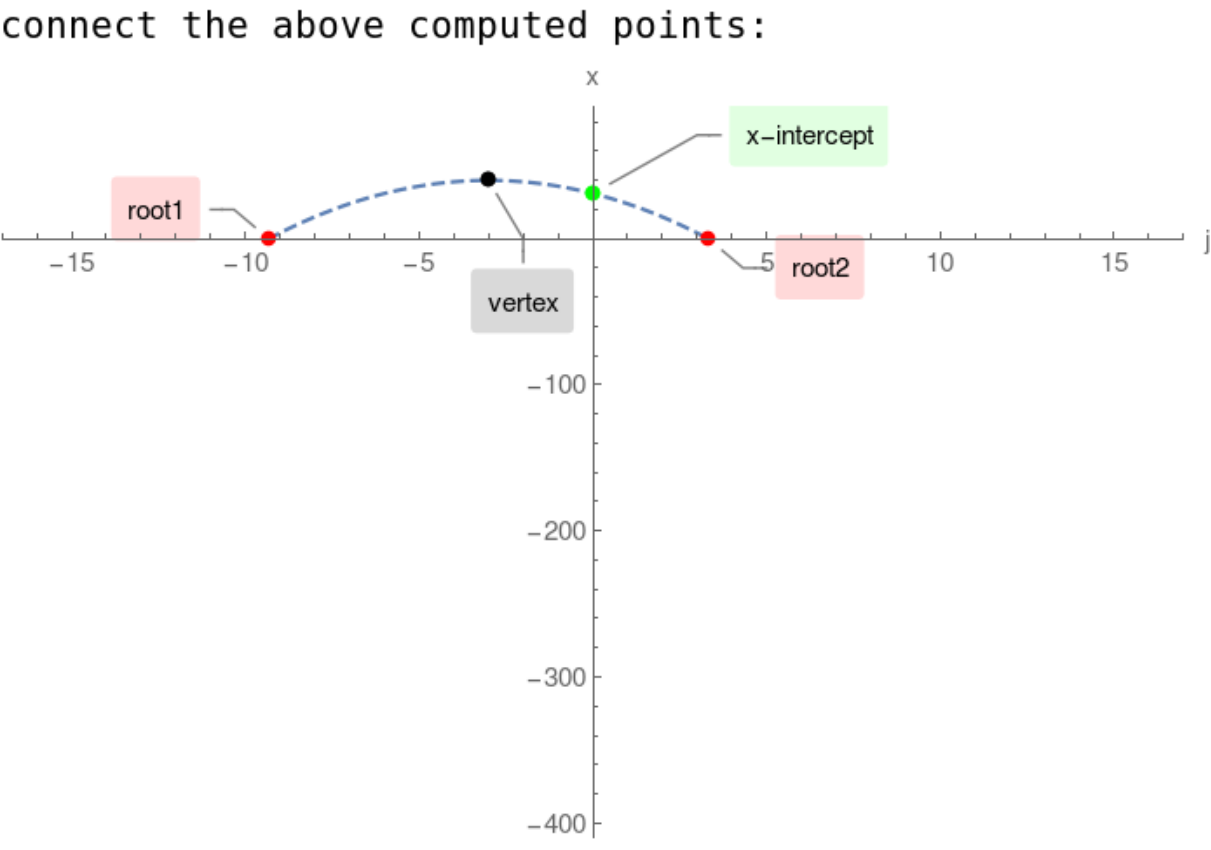
Compute j-intercepts by solving $-j^2 - 6j + 31 = 0$:

$(-3 - 2\sqrt{10}, 0)$, $(-3 + 2\sqrt{10}, 0)$



Step 4.

connect the above computed points:



Step 5.

Extend the parabola beyond the range of intercepts