# Vertex of the Quadratic

Given a quadratic $j(c) = a\,c^2 + b\,c + c$ compute its value at $c_1 = -\frac{b}{2\,a}$ namely $j(c_1) = c - \frac{b^2}{4\,a}$

Now compute the same quadratic at $c_1 + h$, namely

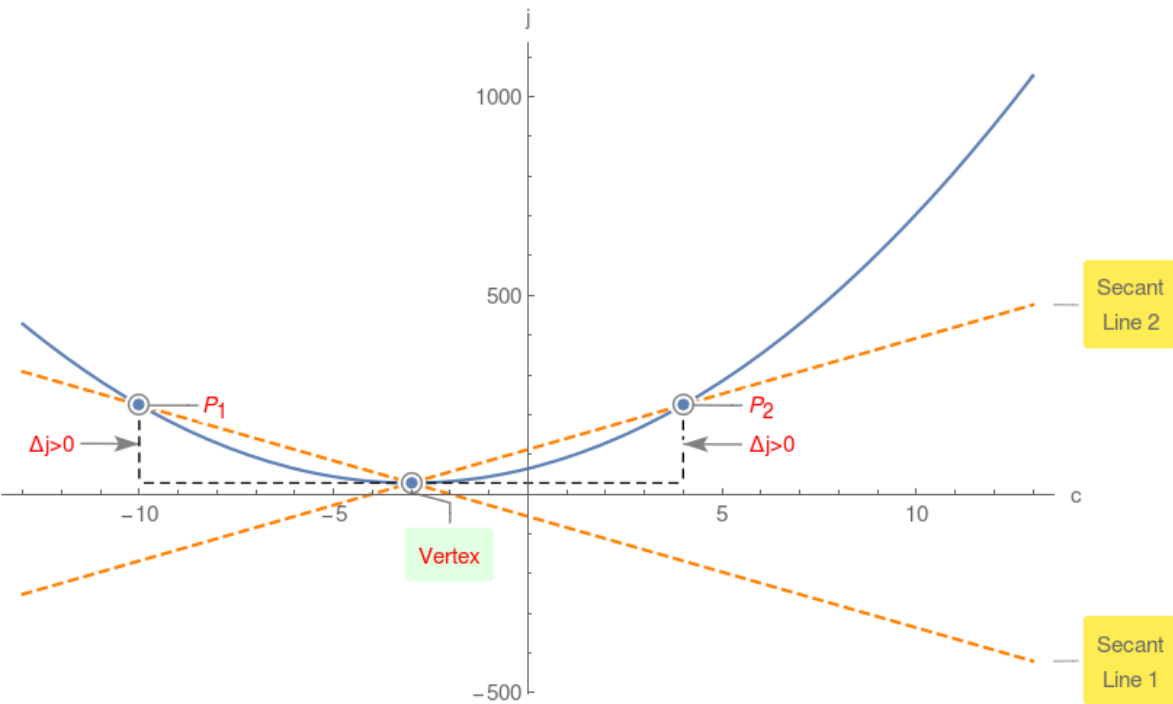
$j(c_1 + h) = -\frac{b^2}{4\,a} + a\,h^2 + c$

Compute $\triangle = j(c_1 + h) - j(c_1) = a\,h^2$

Since $h^2 > 0$, therefore if $a > 0$ then $\triangle > 0$ or vertex is the global minimum!

## Example 1.

$j(c) = 4\,c^2 + 24\,c + 64$




However if $a < 0$ then $\triangle < 0$ or vertex is the global maximum!

## Example 2.

$j(c) = -c^2 + 4\,c - 46$