Vertex of the Quadratic

Given a quadratic $j(v) = a\,v^2 + b\,v + c$ compute its value at
$v_1 = -\frac{b}{2a}$ namely $j(v_1) = c - \frac{b^2}{4a}$
Now compute the same quadratic at $v_1 + h$, namely
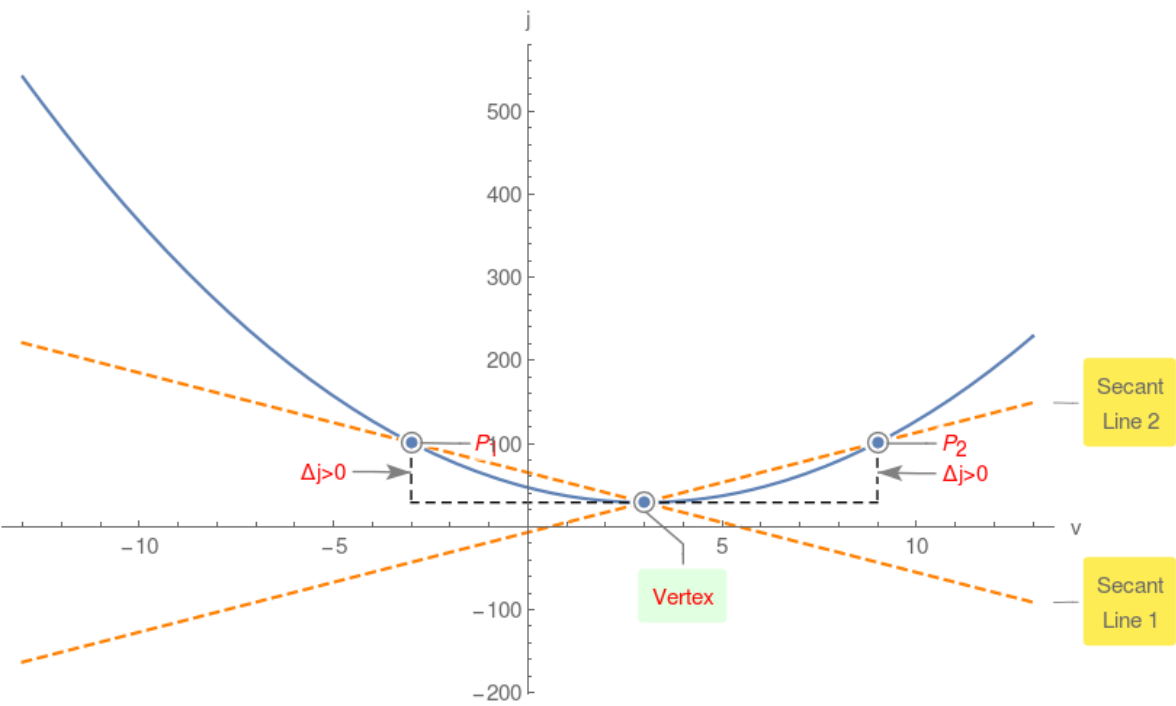$j(v_1 + h) = -\frac{b^2}{4a} + a\,h^2 + c$
Compute $\triangle = j(v_1 + h) - j(v_1) = a\,h^2$
Since $h^2 > 0$, therefore if $\boxed{a > 0}$ then $\triangle > 0$ or vertex is the
global minimum!

Example 1.
$j(v) = 2\,v^2 - 12\,v + 47$

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

Example 2.
$j(v) = -4\,v^2 + 24\,v - 67$