

Vertex of the Quadratic

Given a quadratic $j(n) = an^2 + bn + c$ compute its value at

$$n_1 = -\frac{b}{2a} \text{ namely } j(n_1) = c - \frac{b^2}{4a}$$

Now compute the same quadratic at n_1+h , namely

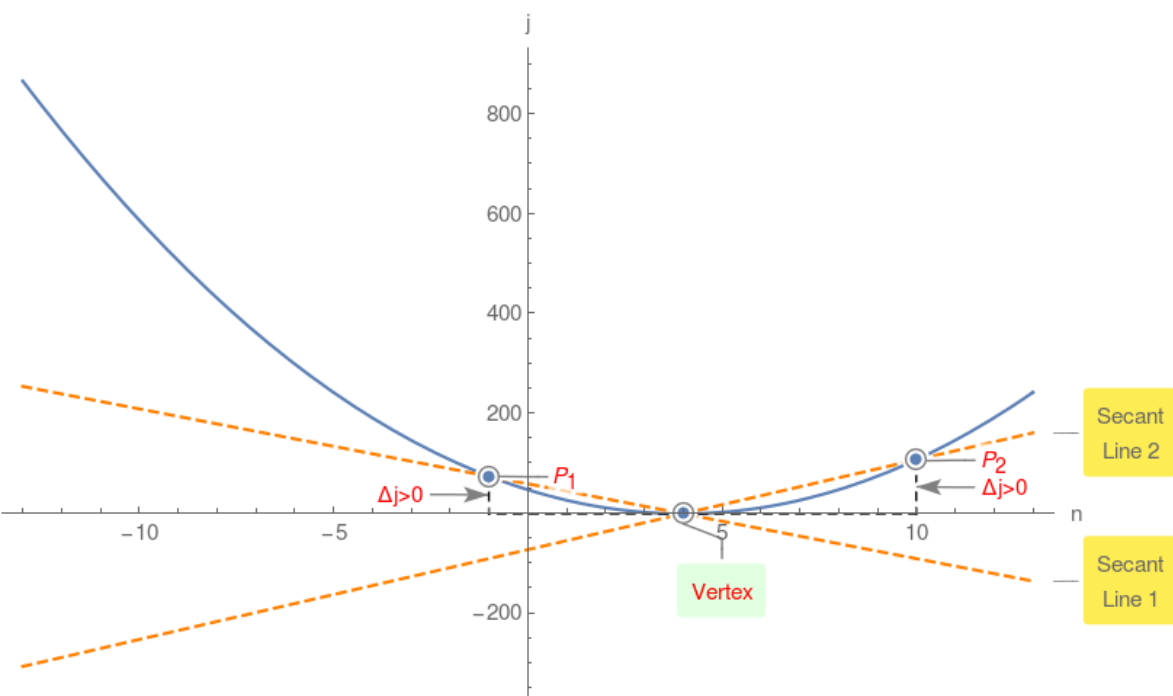
$$j(n_1+h) = -\frac{b^2}{4a} + ah^2 + c$$

$$\text{Compute } \Delta = j(n_1+h) - j(n_1) = ah^2$$

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

Example 1.

$$j(n) = 3n^2 - 24n + 46$$



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

Example 2.

$$j(n) = -3n^2 - 18n - 68$$

