

Vertex of the Quadratic

Given a quadratic $f(z) = az^2 + bz + c$ compute its value at

$$z_1 = -\frac{b}{2a} \text{ namely } f(z_1) = c - \frac{b^2}{4a}$$

Now compute the same quadratic at z_1+h , namely

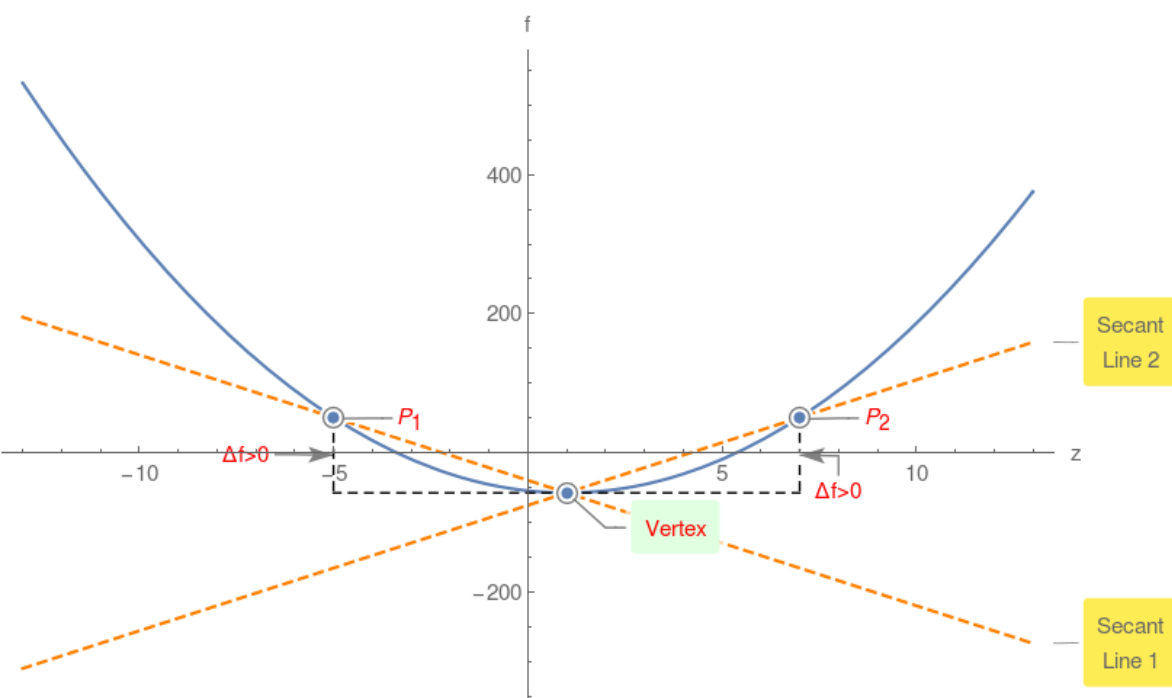
$$f(z_1+h) = -\frac{b^2}{4a} + ah^2 + c$$

$$\text{Compute } \Delta = f(z_1+h) - f(z_1) = ah^2$$

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

Example 1.

$$f(z) = 3z^2 - 6z - 54$$



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

Example 2.

$$f(z) = -z^2 + 6z + 35$$

