Short description of how to get from **constant acceleration motion** formula to **blob_time_to_y** lua helper function.

Let's get started with the formula for constant acceleration motion:

$$s = \frac{1}{2}a \cdot t^2 + v \cdot t + s_0$$

To get the time between two points we need the zero crossings of this function:

$$0 = \frac{1}{2}a \cdot t^2 + v \cdot t + (s_0 - s)$$

Devide with $\frac{1}{2}a$:

$$0 = t^2 + \frac{2 \cdot v \cdot t}{a} + 2 \cdot \frac{(s_0 - s)}{a}$$

Applying the pq formula:

$$t_{1,2} = -\frac{v}{a} \pm \sqrt{(\frac{v}{a})^2 - 2 \cdot \frac{(s_0 - s)}{a}}$$

Formula transform:

$$t_{1,2} = -\frac{v}{a} \pm \sqrt{(\frac{v^2}{a^2}) - 2 \cdot \frac{(s_0 - s)}{a}}$$

Formula transform:

$$t_{1,2} = -\frac{v}{a} \pm \sqrt{\frac{v^2 - 2 \cdot (s_0 - s) \cdot a}{a^2}}$$

Finally we get:

$$t_{1,2} = -\frac{v}{a} \pm \frac{\sqrt{v^2 - 2 \cdot (s_0 - s) \cdot a}}{a}$$