A cyclist is riding along at a constant velocity of 15 m/s. He then accelerates at a uniform rate of 0.50m/s² over a distance of 64 m. How long did he accelerate for?

$v_i = 15 \text{ m/s}$

$a = 0.50 \text{ m/s}^2$

$\Delta d = 64 \text{ m}$

$\Delta t = ?$

$\Delta d = v_i \Delta t + \frac{1}{2} a (\Delta t)^2$

when using this eq'n to solve for Δt and $v_i \neq 0$ You must use quadratic formula!

$64 = 15 \Delta t + \frac{1}{2}(0.5)(\Delta t)^2$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$0.25 t^2 + 15 t - 64 = 0$

$t = \frac{-15 \pm \sqrt{15^2 - 4(0.25)(-64)}}{2(0.25)}$

$= \frac{-15 \pm \sqrt{225 + 64}}{0.5}$

$= \frac{-15 \pm \sqrt{289}}{0.5}$

$= \frac{-15 \pm 17}{0.5}$

$t_1 = \frac{-15 - 17}{0.5}$

$= -64 \text{ s}$ ✗

$t_2 = \frac{-15 + 17}{0.5}$

$= 4.0 \text{ s}$ ✓