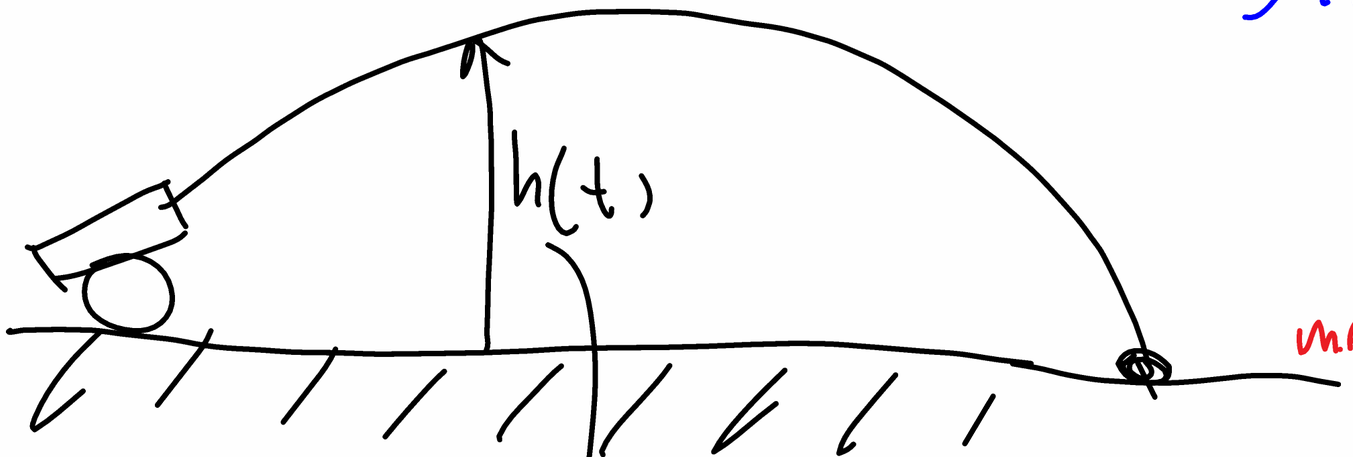
WORKING WITH FUNCTION NOTATION

Th 18 Oct. 2018

We can describe cannon ball's trajectory as "height versus time":

$$h(t) = -4.9t^2 + 19.6t + 34.3$$

h is a function of t



height of cannon ball after t seconds of firing

Physically meaningless

What's height at t=0?

$h(0) = 34.3$ cm

After how many seconds does the cannon ball reach the floor?

Solution: It's given by the x-intercepts of $h(t)$

$$h(t) = -4.9t^2 + 19.6t + 34.3$$

t-intercepts:

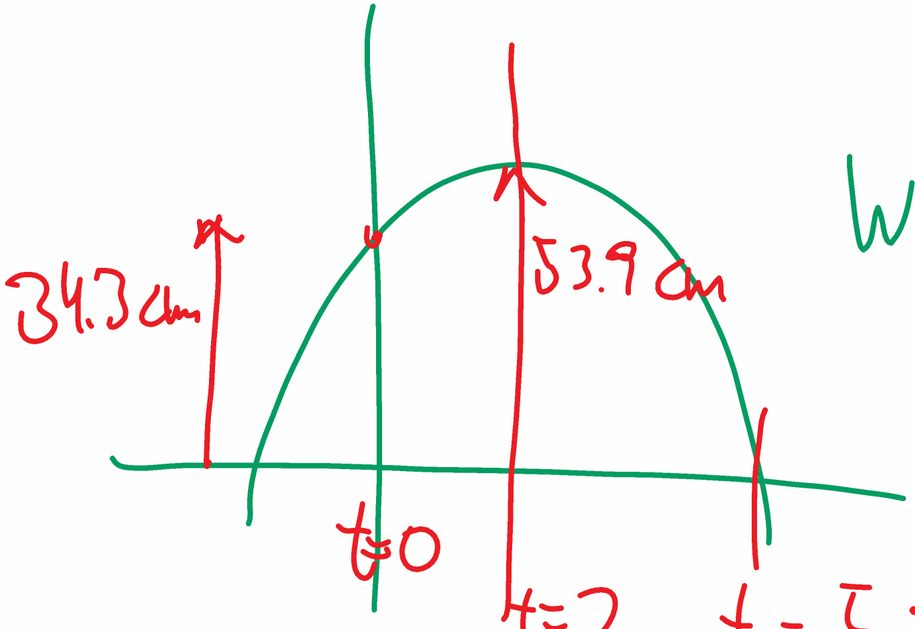
$$0 = -4.9t^2 + 19.6t + 34.3$$

$$t = \frac{-19.6 \pm \sqrt{19.6^2 - 4 \cdot (-4.9) \cdot 34.3}}{2 \cdot (-4.9)} = \frac{-19.6 \pm \sqrt{384.16 + 672.28}}{-9.8}$$

$$ax^2 + bx + c = 0$$

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

$$t = \frac{-19.6 \pm \sqrt{1056.44}}{-9.8} = \frac{-19.6 \pm 32.5079}{-9.8} = \begin{cases} + & \frac{12.9079}{-9.8} = -1.32 \\ - & \frac{-52.1079}{-9.8} = 5.32 \end{cases}$$



What is the max height?

$$\text{axis-of-sym} = \frac{-1.32 + 5.32}{2} = 2s$$

$$h(2) = -4.9 \cdot 2^2 + 19.6 \cdot 2 + 34.3 = 53.9 \text{ cm}$$

axis of symmetry, it's the location of vertex

HOMEWORK

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Questions 2) & 9)