2. [9 points] The height of water in a cylindrical tank, as it drains out, is given by

$$H = h(t) = 4t^2 - 40t + 100,$$

where H is measured in centimeters and t is measured in minutes after a spigot is opened. The formula holds until the tank is emptied, after which, the height does not change anymore.

For your reference, the zeros of $y = ax^2 + bx + c$ can be found by the formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

a. [2 points] How high is the water in the tank when the spigot is first opened? Give your answer in exact form, or rounded to two decimal places. Include units.

Water height: _____

b. [2 points] After how many minutes is the tank empty? Show all work. Give your final answer in exact form or rounded to two decimals places.

_____ minutes

c. [2 points] What is a reasonable domain and range for this function in the context of the problem? Use inequality OR interval notation for your answer.

Domain:

Range:

d. [3 points] How long does it take for the tank to be half as full as it started? Show all work. Give your final answer rounded to two decimals places.

minutes