2. [13 points] A rain gutter attaches to the edge of a roof and collects the rain that falls on the roof. A common gutter design is shown in the figure to the right, and has a trapezoidal cross-section (also shown). In this problem we consider a gutter with base and side length 9 cm, as shown.

a. [1 point] Write an equation which relates the length $x$ to the height $h$.

b. [4 points] Using your equation from (a), write an equation for the cross-sectional area of the gutter as a function of the length $x$ (note that the area is the sum of a rectangular and right-triangular region).

c. [8 points] Find the length $x$ that gives the maximum cross-sectional area. Be sure to show work that demonstrates that you have found the maximum.