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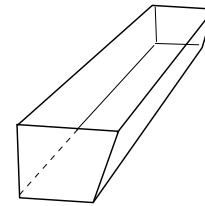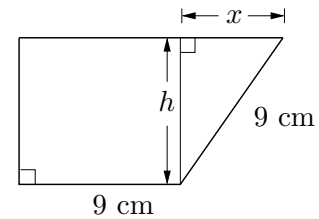the rain that falls on the roof. A common gutter design is shown
in the figure to the right, and has a trapezoidal cross-section (also
shown). In this problem we consider a gutter with base and side
length 9 cm, as shown.

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.