Criteria	Level						Total
Method (40%)	0	8	16	24	32	40	
Application & Calculations (40%)	0	8	16	24	32	40	
Completeness, Clarity & Validation (20%)	0	4	8	12	16	40	

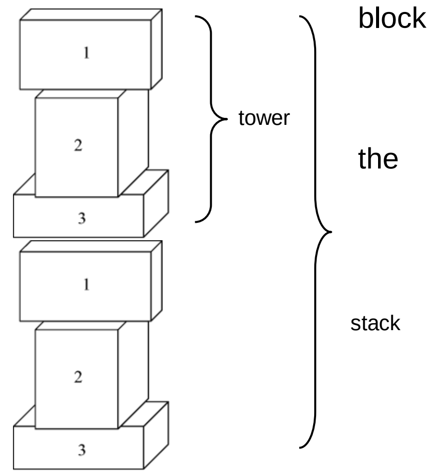
Situational Problem

Stacking Towers

The holiday season is a time for giving. The annual Holiday Drive is an opportunity for students to help out families within their community. Student Council wants to supplement the donations this year by raising money. They decide to run a simple competition in which teams of students pay to participate and must stack sets of three wooden blocks as high as they possibly can.

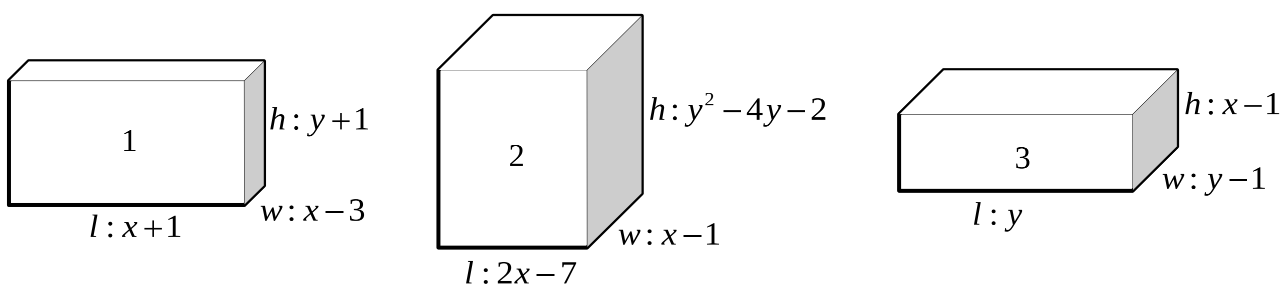
The details of the competition:

- One tower consists of three wooden blocks arranged in order: block 3 on the bottom, block 2 in the middle and 1 on top
- Only complete towers can be stacked
- Each block is a right rectangular prism
- The area of the base of block 1 is the same as the area of base of block 2
- The volume of block 2 is the same as the volume of block 3
- You may assume that with the use of ladders, you will always be able to reach the top of your stacked towers
- You may assume that your tower does not topple over during the competition
- There are an unlimited number of wooden blocks
- There is no time limit
- All measurements are in decimeters



Although Student Council did not reveal the numerical dimensions of the blocks, they did provide algebraic expressions for the dimensions as shown in the diagram below.

Expressions for the dimensions of the wooden blocks:



Expression for the height of the gym:

$$h=\left(\frac{20y^2-320}{25x^2-10x+1}\right)\left(\frac{35x^2+20x-2}{y+4}-\frac{2x^2-x-6}{xy-2y+4x-8}\right)$$

With this information, your team would like to determine two things…

- The simplified expression for the height of the gym
- The number of completed towers that would make up the tallest possible stack that could fit in the gym