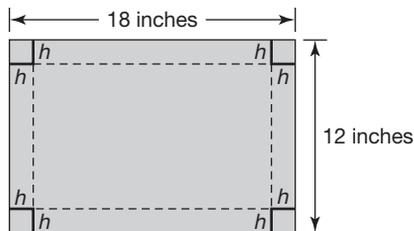


## PROBLEM 1 Business Is Growing



The Plant-A-Seed Planter Company produces planter boxes. To make the boxes, a square is cut from each corner of a rectangular copper sheet. The sides are bent to form a rectangular prism without a top. Cutting different sized squares from the corners results in different sized planter boxes. Plant-A-Seed takes sales orders from customers who request a sized planter box.

Each rectangular copper sheet is 12 inches by 18 inches. In the diagram, the solid lines indicate where the square corners are cut and the dotted lines represent where the sides are bent for each planter box.



It may help to create a model of the planter by cutting squares out of the corners of a sheet of paper and folding.



1. Organize the information about each sized planter box made from a 12 inch by 18 inch copper sheet.
  - a. Complete the table. Include an expression for each planter box's height, width, length, and volume for a square corner side of length  $h$ .

Square Corner Side Length (inches)	Height (inches)	Width (inches)	Length (inches)	Volume (cubic inches)
0				
1				
2				
3				
4				
5				
6				
7				
$h$				

Recall the volume formula  $V = lwh$ .



b. What patterns do you notice in the table?

2. Analyze the relationship between the height, length, and width of each planter box.

a. What is the largest sized square corner that can be cut to make a planter box?  
Explain your reasoning.

b. What is the relationship between the size of the corner square and the length and width of each planter box?

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c. Write a function  $V(h)$  to represent the volume of the planter box in terms of the corner side of length  $h$ .