



A Tale of Two Functions:  
Exploring Cubic Functions

*Dr. Anne Papakonstantinou*

*apapa@rice.edu*

*rusmp.rice.edu*

*Dr. Joanna Papakonstantinou*

*jpapakonstantinou@ehshouston.org*

CAMT 2018

July 18, 2018

11:30 a.m. – 12:30 p.m.

Room 360 A

George R. Brown Convention Center

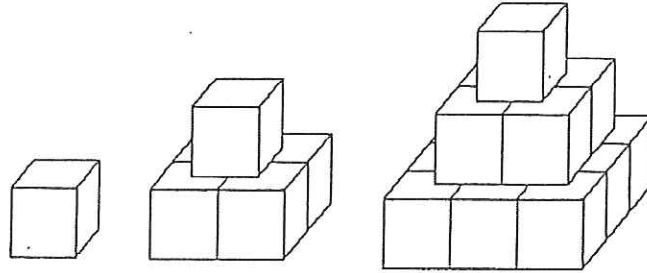
Houston, Texas

In grades 9-12 all students should

- generalize patterns using explicitly defined and recursively defined functions;
- understand relations and functions and select, convert flexibly among, and use various representations for them;
- understand and perform transformations such as arithmetically combining, composing, and inverting commonly used functions, using technology to perform such operations on more-complicated symbolic expressions;
- understand and compare the properties of classes of functions, including exponential, polynomial, rational, logarithmic, and periodic functions; and
- interpret representation of functions of two variables.

*NCTM Principles and Standards for School Mathematics*, p. 395

## Pyramid Functions



You can use blocks to build pyramids such as those shown above. Complete the table showing the number of layers in each pyramid and the number of blocks needed to build it. All pyramids are solid with no empty space inside.

a.

Layers (n)	1	2	3	4	5	8	50
Blocks (b)							

- b. Use finite differences to find the degree of the relationship.
- c. Write an equation for this relationship.
- d. Use your model to predict the number of blocks needed to build a pyramid 8 layers high.
- e. Graph and trace the curve to find the number of layers in a pyramid built with 650 blocks.

## Paper Folding & a Triangle's Maximum Area

Take an 8.5 (height) x 11 (base) sheet of paper. Fold the upper left-hand corner so that it touches some point on the base of the same sheet.

Find the area of triangle A that is formed in the lower left-hand corner of the paper.

Find the distance along the base (x) that produces the triangle with the greatest area.

Does the length of the base matter?

Try this activity with paper of different dimensions.

