

# How Can I Use Mathematics After Graduation?

## Let Algebra Build Your Dream Home

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## Algebra and Your Dream Home

LESSON PLAN TOPIC: Quadratic Functions

TITLE: Algebra and Your Dream Home

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GRADE LEVEL: : 10<sup>th</sup> to 11<sup>th</sup>

TOPIC CONTENT: Algebra II

TEXAS STANDARDS (TEKS): Obj. 1 A(b)(1), A(b)(2); Obj. 2 A(b)(3), A(b)(4);  
Obj. 5 A(d)(1), A(d)(2); Obj. 8 (8.8); Obj. 10 (8.14)

NCTM STANDARDS: Problem Solving, Communication, Connections, Representation, Reasoning and Proof

OBJECTIVES: To explore quadratic functions through a real world application and to relate a real world situation to a mathematical concept and thus tie the two together. To show students how the mathematics content objectives connect to the real world.

ASSESSMENT: (formative and summative): The assessment will be handled through discussions that take place in class and the informal as well as formal presentations that take place. The final written report will also be taken as a summative assessment.

MATERIALS: The only materials that will be needed are grid (graph) paper to draw the house plan and graph the equation, a straight edge, and a pencil.

PROCEDURES: Background Work: The student will first be asked to discuss his/her dream house. Topics will range from how many bedrooms and how

many bathrooms to the ideal size of these rooms, and even how large the closets should be. The student will then have to research the size and dimensions of the different rooms in different homes with the eventual idea of coming up with dimensions for their ideal home. This will include going home and measuring the different rooms and asking their different family members about this topic.

The student is asked to report the result of the research in an informal manner to the class and then a class discussion will follow about the different dimensions of the various rooms and of the appeal to the different students. After a complete discussion, the student will be given a piece of grid paper and a straight edge, and the student will be asked to draw his/her dream home, giving the dimensions of each room, as well as the entire house. The student will provide a legend for the drawing using the correct scale (example: one square of the grid represents one square foot in the house).

**REFLECTION:** The student is asked to discuss any problems faced in creating the drawing of the house and of the scale used.

**ALGEBRAIC EXTENSION:** After this subject has been discussed and any questions answered, the student is to create a table of values showing the different rooms in the house, the perimeter of each room, and the area of each room. The student is also asked to include the perimeter and area of the entire house. Then the student is asked to choose one side of one of the rooms (any one of the rooms) and label that side as  $X$ . Now, the student is asked to create another table of values, but these values presented must be in terms of  $X$ . Once the table has been created, the student is asked to create a graph of the polynomial that represents the entire house and come up with an explanation for the values found on the graph and what each axis represents.

The student is now asked to take the polynomial equation that represents the area of the entire house and set it equal to the actual area of the entire house (that was previously found), and solve the created equation for  $X$ . The student is to explain the process (in paragraph form), and explain any discrepancies that may occur between the original value of  $X$  and the derived

value of  $X$ . The student is to compile everything neatly and prepare it to formally present to the class.

**REFLECTION:** The student is asked to reflect on everything that has been done and discuss the changes or modifications that had to be made.

**CLOSURE:** The evaluation is given by fellow students at the time of each presentation. Furthermore, a rubric is created by the students and the teacher at the beginning of the project and the grading is adhered to. An example of one rubric is as follows:

Initial grid drawing with labels using proper scale.	20%
Table of values showing rooms, perimeter, area, and values of entire house.	20%
Graph of polynomial representing entire house as well as explanation of each value. Work showing the finding of the areas of each individual room in terms of $X$ .	20%
Work on solving for $X$ as well as the explanation of the process and the discrepancies.	20%
Presentation and final product.	20%
Total	<hr/> 100%

References:

This is original work by Robert Perez.