***Square Roots and Surface Area* Project Based Learning Unit**

So far, we have worked on the theory of square roots and surface area. Now, we want you to put those skills into practice. After all, these math skills are important in the real world. For this project, your group will use your knowledge and skills of square roots and surface area, to design an outdoor facility in our school’s courtyard. All of the grade nine math classes will be working on this project. You will need some more skills to complete your project, so your teacher will construct mini-lessons that focus on these skills. Part of the class will be mini-lessons, while the other part will be used as project time.

**Project Goal**

The goal of your project is to design an outdoor theatre that could be constructed in the MVHS courtyard. Your design must include:

* A stage
* Seating for 60-100 people
* Two other pieces of infrastructure created by you (ex: concession stand, washrooms, etc.)

**Project Steps**

* **Step One** – Visit the courtyard and create a scaled drawing with the trees. Be sure to include the length and width of the courtyard as well as the lengths between trees and the outer walls. Side lengths should be expressed in √ where applicable.
* **Step Two** -- Create staging, seating, and two other pieces of infrastructure. Use the calculations handout to create each piece – you must include a drawing of the infrastructure as well as calculations and measurements.
* **Step Three** – Create a final copy of your design on grid paper to be submitted for marks. Measurements must be converted to metric.

**Other Project Criteria**

**Stage:** The stage **MUST** be a minimum of 49 square metres and no more than 56 square metres.Choose one of the following shapes for your stage:

* Rectangle
* Hexagon
* Cylinder

\*Composite shapes are to be constructed from the following shapes: cubes, right rectangular prisms, right cylinders, triangular prisms (be sure to use pythagorean theorem for this).

**Seating:** Seating must be made for 60-100 people, with the average person requiring a minimum of 1444 cm2 surface are of seating space. Also ensure that there is adequate space to walk between spaces and aisles.

**Paint:** A top quality self-priming exterior paint will cover approximately 350 square feet per gallon. You must convert this into square meters and liters in order to do your calculations. And remember two or three coats of paint are often necessary.

**Proposal Option:** If your group would like to design something different than a theatre, you have the option of doing so. However, you must write a proposal explaining your design ideas. Once the proposal is approved, you can continue with your idea. I have forms for the proposals if you decide to do this option.