

## Option 1: Volume and Surface Area of a Piece of Furniture

Product: Poster or document with photograph of object, drawings of shapes, and calculations

Suggested for: Designers, visual artists, hands-on learners

Geometry is often the basis for functional design, found around the house in sofas, tables, chairs and other pieces of furniture or décor. Your task is to take a piece of furniture in your home, choose appropriate shapes (prisms, cylinders, cones, etc.) and calculate the composite volume and surface area after taking accurate real-life measurements of the object. The final product should include a photo of the object, sketches of the shapes (4 at minimum) used to model the object with measurements marked, and worked out calculations showing how you arrive at the volume and surface area calculations.

Objects should be chosen and submitted for approval by: March 13

Final due date: March 28 (A) or 29 (B)

## Option 2: Indirect Measurement

Product: Poster or document with photographs, photographs overlaid with triangles, and worked out calculations

Suggested for: Real-world math enthusiasts, collaborators, trig buffs

Similar triangles and trigonometry can be used in finding lengths of hard-to-measure distances and heights. Your tasks are to (1) use shadows or mirrors to calculate the height of a tall object by using similar triangles (AA) and setting up and solving a proportion after taking measurements of the three easy-to-measure distances in order to find the fourth, and (2) use a clinometer (either home-made or an app) and trigonometry to find a missing measurement (height of an object, how far away something is from an elevated vantage point, etc.) using only 1 known length and the clinometer's angle reading. Your product should include photographs illustrating the scenario, a triangle overlay atop the photographs illustrating the geometry involved, and all necessary calculations.

Scenarios should be submitted for approval by: March 13

Final Due date: March 28 (A) or 29 (B)

### Option 3: YouTube Videos of Review Skills

Product: Fifteen minutes worth of YouTube videos where you work through examples of skills from the fall semester.

Suggested for: Future educators, tutors, technology gurus

Math help videos are all over the internet and vary widely in quality. They are usually made by teachers...but why shouldn't students have a voice? Your task is to choose 3 distinct skills from the fall semester and write assessment or homework-style questions related to the skill and record fifteen minutes worth of videos reviewing the concept and working through the problems. The videos could feature you in front of a board with a tripod mounted camera, or perhaps a close up of your work under a document camera-like set up, or completely digital using a free app like Doceri. The videos should be no more than 15 minutes in total length, or about 5 minutes per example.

Written questions and video style should be submitted for approval by: March 13  
Final Due date: March 28 (A) or 29 (B)

### Option 4: The Law of Sines and The Law of Cosines

Product: Poster or document proving and explaining the two laws with worked out examples of each, both abstract and in real-world context.

Suggested for: Independent workers, math pros

Trigonometry has been limited to right triangles in our lessons so far. There are two separate laws that extend the concept of trigonometry and finding missing sides and angles to include any kind of triangle, not just right triangles. These are called the Law of Sines and Law of Cosines and they work in specific instances. Your task is to research the laws and develop a poster or document that includes a proof of each law along with worked out examples for each, in both abstract and context-based situations. Some research materials will be provided for you to summarize and describe.

Examples you plan to use should be submitted for approval by: March 13  
Final Due date: March 28 (A) or 29 (B)