Trigonometric Measuring Project

General Information

Course: Math Academy I

Chapter: four

Assigned: Thursday, November 17

Due: Friday, December 2

Points: 30

Group Size: 2 to 4 people

Format: poster

Summary: Make a clinometer, and use it to measure the height of a tall object.

Bonus: For up to +20%, use the law of sines to measure the height of an object whose base you cannot reach.

Directions

1. Create a clinometer.
2. Choose a tall object outside.
3. Standing several meters from the base of the object, measure the distance to the base (directly below the top), the distance from the ground to eye-level, and the angle of elevation from your eye to the top. Measure all lengths in metric.
4. Repeat step 3 three additional times, standing a significantly different distance away from the base of the object each time.
5. Sketch the situation to scale. This will include four right triangles, in which the hypotenuse is different for each, and a drawing of the object being measured. Use a different color for each.
6. Using colors corresponding to the sketch, calculate the height of the object once for each of the four sketched triangles. Show all trig equations and work.
7. Based on the average of your answers and on the similarity of your answers, estimate the true height of the object and comment on how precise this measurement seems to be.

Scoring

[A] The sketch and calculations are correct and easy to follow.

10	All the work and answers are shown clearly and correctly, and the sketch is clear, to scale, and easy to match to the work.
8-9	The work, answers, and sketch, are all reasonable.
5-7	Some equations are missing or incorrect, or one or more of the answers is not reasonable or does not match the sketch.
1-4	The answers are widely unreasonable, or the measured angles are placed in the wrong place in the sketch.

[X] All steps are completed.

10	All stated directions are followed.
1-9	One or more aspects of the project is omitted or incomplete.

[Y] The final product is attractive.

10	The poster is neat, colorful, and attractive.
1-9	The aesthetic quality of the poster is not superior.