

Discovery: the Law of Sines and the Sine area of a triangle

1. Go to the GeoGebra Applet: <https://www.geogebra.org/m/teZeAxWN>
2. Move the slider to drop the altitude, forming a right triangle
3. Using trig definitions, relate angle B, and sides height and c
4. Solve your relation in (4) for the height



5. Using trig definitions, relate angle C, and sides height and b

6. Solve the relation in (5) for the height

7. Set the values for height in (4) and (6) equal to each other, and solve for all C's on one side and all B's on the other

Pat yourself on the back, you've just discovered and proven the **Law of Sines!**

The Sine Area of a Triangle

8. Draw a triangle and give the general formula for its area
9. For the triangle in the applet, use the formula for height in (6), and the base (a), to find the area of the general triangle
10. If needed, reorder (9) so that the $\sin(C)$ is at the end of the product

Engineers Need *Flowers* to Reduce that STANK!

(and they probably aren't getting any 🙄)

1. A real world problem:

Eileen, being hip and wanting butterflies, is trying to lobby President Cantwell of USU, to instate a wildflower garden in a seldom used but water-hungry section of the Engineering quad.

To do so, she needs to find out how much water the university will save in planting wildflowers. By conservative estimates, 20 gallons of water will be saved per year for every square foot of replaced grass. Follow the steps below, using the theorems you've just proved, to find out how much water will be saved



2. Use the QR code or follow this link: <https://qrco.de/bfSNJE>

3. Use Google Map's measure distance tool to find the upper two side lengths of the triangle it's centered on

4. When constructing the sidewalk BA, the measure of angle B was noted as 53 degrees. Use your measurement to find out the measure of angle A



5. Use the sine area of a triangle to find out the area of this grass patch

6. Use the conservative estimate of saved water to find out how much water would be saved over the next year if wildflowers are planted. Then, write a brief note to President Cantwell telling her your estimate of saved water.