

Triangle Solver — Quick Guide

What This Is

Triangle Solver is a single-page web app you open directly in a browser — no download, no install, and no account required. It runs entirely on your device, so nothing you type is sent anywhere.

What It's For

A triangle has six basic measurements: three side lengths and three angles. In most real situations — a measurement taken on a job site, a value given in a homework problem, a plan sketched by hand — only some of those six values are known at any one time, and the rest have to be derived from them.

Why You'd Want to Use It

Working out the remaining sides and angles by hand means identifying which formula applies — the Law of Cosines, the Law of Sines, or a basic angle-sum rule — and carrying out the trigonometry correctly, which is easy to get wrong without much practice or under time pressure. Triangle Solver identifies which case applies to whatever you've entered and runs the calculation for you, so you don't have to remember or rework the formulas yourself.

That's useful anywhere a full set of six measurements isn't available up front: laying out an angled cut or brace in carpentry, checking a roof pitch or rafter angle, planning a garden bed or fence line that isn't a simple rectangle, or working through a geometry assignment and wanting to check your own answer.

What It Does

- **Solves a triangle from any three of the six values.** Enter any combination of sides and angles; the app identifies which standard case applies and runs the matching formula automatically.
- **Detects the ambiguous two-solution case.** Two sides plus an angle that isn't between them can sometimes fit two different valid triangles — when that happens, both are shown as switchable tabs.
- **Calculates perimeter, area, and triangle type.** Area is found via Heron's formula, and the triangle is labeled by both its angles (acute, right, obtuse) and its sides (equilateral, isosceles, scalene).
- **Calculates all three altitudes** (the perpendicular height from each corner to the opposite side), each shown on its own small diagram.
- **Flags invalid input immediately**, explaining in plain language when the numbers entered can't form a real triangle, or when too few or too many values are filled in.
- **Shows a live, labeled diagram** of the solved triangle that updates automatically as you type.

How to Use It

1. Open the app in your browser.
2. Type any three values — any mix of sides and angles — into the fields. The greyed-out numbers already sitting in the side boxes are just placeholder examples; they disappear as soon as you start typing.
3. Watch the answer appear automatically below. There's no "Calculate" button — the result card fills in as soon as exactly three valid values are entered.
4. If the numbers can't form a triangle, read the message that appears in place of a result; it explains why in plain language.
5. (Optional) If two triangles both fit your numbers, use the "Solution 1 / Solution 2" tabs above the diagram to view either one.
6. (Optional) Tap "Clear all" to wipe every field and start over.
7. Keep your units consistent: the app doesn't assume inches, centimeters, or any other unit for sides — if one side is in inches, all your side lengths need to be in inches. Angles are always in degrees.

A Note on the Ambiguous SSA Case

When you enter two sides and an angle that is not the angle between them, the numbers you've given can genuinely correspond to zero, one, or two different real triangles — this isn't a quirk of the app, it's a property of the geometry itself. If two triangles are possible, Triangle Solver shows both, and the diagram and every figure below it (perimeter, area, altitudes) update to match whichever tab is selected. If you were expecting a single answer and see two tabs, that's expected — it usually means an additional piece of information (such as whether the target angle is acute or obtuse) is needed to know which one matches your real-world situation.