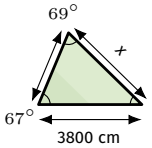
Converting a Baseline Before Triangulating

Convert the baseline to metres before using the sine rule.



Question 1. A surveyor sets a baseline of 3800 cm between peg A and peg B. The angle at A between the baseline and the sightline to boundary corner C is $67°$. The angle at corner C is $69°$, as shown.

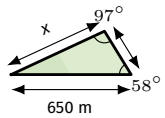
(a) Convert the baseline to metres.

(b) Use the sine rule to calculate the distance from B to corner C, correct to 1 decimal place.

(c) New boundary fencing along BC costs $21.00 per metre. Using the full-precision distance, find the total cost, to the nearest cent.

A Harbour Rescue: Distance and Time

Match each side to the angle it is opposite, then convert units carefully.



Question 2. Two rescue points, A and B, are 650 m apart along a harbour entrance. The angle at the vessel's position C is $97°$. The angle at B, between the shoreline and the sightline to the vessel, is $58°$, as shown.

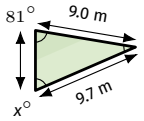
(a) Use the sine rule to calculate the distance from A to the vessel, correct to 1 decimal place.

(b) Convert a rescue boat's speed of 18 km/h into metres per minute.

(c) Using the full-precision distance from (a), find the time (in minutes, correct to 1 decimal place) for the boat to travel from A to the vessel.

Finding a Guy-Wire's Ground Angle

Two sides and a non-included angle are given here – this is safe (only one triangle fits) because the KNOWN angle ($81°$) is opposite the LONGER of the two known wires (9.7 m > 9.0 m), which always gives a unique triangle.



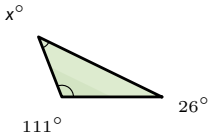
Question 3. Two guy-wires run from ground anchors A and B to the same point C at the top of a radio mast. The wire from A is 9.0 m long and makes an angle of $81°$ with the ground. The wire from B is 9.7 m long, as shown.

(a) Use the sine rule to calculate the angle the wire from B makes with the ground, correct to 1 decimal place.

(b) Hence calculate the distance between the two ground anchors A and B, correct to 1 decimal place.

Checking a Bridge Truss's Apex Angle

Use the angle sum of a triangle (angles add to 180°).



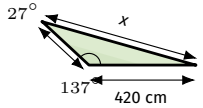
Question 4. A pedestrian bridge truss has its two base angles measured as 111° at A and 26° at B, as shown.

(a) Use the angle sum of a triangle to calculate the apex angle, C.

(b) Engineering guidelines require the apex angle to be no more than 40° for stability. Does this truss meet the guideline?

Buying Edging for a Garden Bed

Convert to metres, use the sine rule, then round the purchase up to a whole metre.



Question 5. A narrow triangular garden bed runs alongside a 420 cm fence (the baseline AB). The angle at A is $137°$; the angle at corner C is $27°$, as shown.

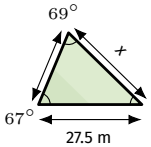
(a) Convert the baseline to metres.

(b) Use the sine rule to calculate the length of the edge from B to corner C, correct to 1 decimal place.

(c) Edging is sold only in whole 1 m lengths at \$9.90 per metre. Using the full-precision length, find how many metres must be bought, and the total cost.

Choosing a Fencing Supplier

Use the sine rule, then compare the two suppliers using the full-precision length.



Question 6. A subdivided section has a 27.5 m road-frontage baseline, AB. The corner angles are $67°$ at A and $69°$ at corner C, as shown.

(a) Use the sine rule to calculate the length of side BC, correct to 1 decimal place.

(b) Supplier A sells fencing continuously at \$16.80 per metre. Supplier B sells a single pre-cut length, up to 30 m, for a flat \$500. Calculate the cost from each supplier, using the full-precision length for Supplier A.

(c) Which supplier is cheaper, and by how much?