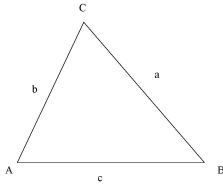


MAT4010 Pretest Trigonometry

Helmer Aslaksen

0.1. When and why do we use radians?

0.2. Given a triangle,



we can sometimes use the law of sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C},$$

the law of cosine

$$\begin{aligned}a^2 + b^2 - 2ab \cos C &= c^2, \\a^2 + c^2 - 2ac \cos B &= b^2, \\b^2 + c^2 - 2bc \cos A &= a^2,\end{aligned}$$

and the angle sum theorem

$$A + B + C = 180,$$

to “solve” a triangle, i.e., determine the remaining sides and angles when we are given some of them. Show how you can solve a triangle if you know

SSS All the three sides.

SAS Two sides and the included angle.

SsA Two sides and the angle opposite to the longer side.

ASA or SAA One side and two angles.

- 0.3. Show that if $A = 30$, $b = 4$ and $a = 3$, then you cannot solve the triangle. That is, show that there are two different triangles that satisfy the conditions.
- 0.4. When can the law of sines give you two solutions? How can you make sure that you can use the law of sines safely?
- 0.5. Can the law of cosines ever give you two solutions?