

# Law of Sines and Law of Cosines: math test, Grade 12

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Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

### 1 Law of Sines

/ 4 pts

In triangle  $ABC$ ,  $A = 38^\circ$ ,  $B = 64^\circ$  and  $a = 11$  cm. Find  $C$ ,  $b$  and  $c$ , rounded to the nearest tenth.

### 2 The ambiguous case

/ 4 pts

Let  $A = 25^\circ$ ,  $a = 9$  and  $b = 18$ . (a) How many triangles exist? (b) Find every possible value of  $B$ ,  $C$  and  $c$ .

### 3 Three sides

/ 4 pts

A triangle has sides 9, 12 and 16. (a) Find the largest angle. (b) Find the other two angles. (c) Find the area with Heron's formula. Round angles to the nearest tenth of a degree and the area to the nearest hundredth.

#### 4 Two sides and the included angle

/ 4 pts

In triangle  $ABC$ ,  $a = 15$ ,  $b = 22$  and  $C = 57^\circ$ . Find side  $c$ , the area, and angle  $A$ .

#### 5 Two ships

/ 4 pts

Leaving harbor H, ship A sails 60 km on bearing  $020^\circ$  and ship B sails 85 km on bearing  $100^\circ$ . (a) How far apart are the ships? (b) What is the bearing of ship B from ship A? Round to the nearest tenth.



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