

Law of Sines, Law of Cosines and Area

Grade 12 – Precalculus math · Test · Standards: G-SRT.D.9, G-SRT.D.10, G-SRT.D.11

Name: _____ Date: _____ Class: _____

This 45-minute test has 8 questions worth 20 points. It covers area, Heron's formula, both laws, the ambiguous case, a bearing problem and a survey. A calculator is allowed. Show each substitution so partial credit can be awarded.

Standards: G-SRT.D.9, G-SRT.D.10, G-SRT.D.11 · **Level:** Grade 12 Precalculus

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Area of a Triangle (2 points)

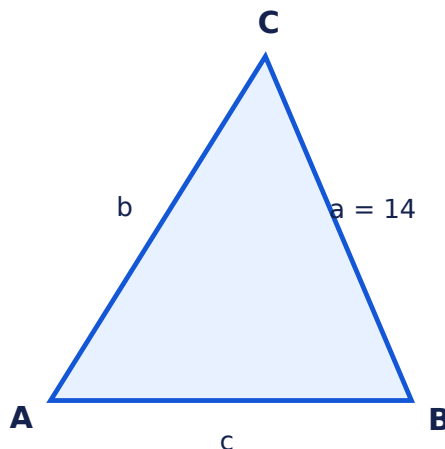
A triangular garden bed has sides of 16 feet and 11 feet enclosing an angle of 47° . Find its area to the nearest tenth of a square foot.

Question 2 Heron's Formula (2 points)

Find the area of a triangle with sides 10, 17 and 21 centimeters.

Question 3 Law of Sines in a Triangle (3 points)

In the triangle, $A = 58^\circ$, $B = 67^\circ$ and side $a = 14$.



Triangle with $A = 58^\circ$, $B = 67^\circ$ and $a = 14$.

a. Find angle C. (1 point)

- b. Compute side b with one decimal. (1 point)
- c. Compute side c with one decimal. (1 point)

Question 4 Law of Cosines, Then Law of Sines (3 points)

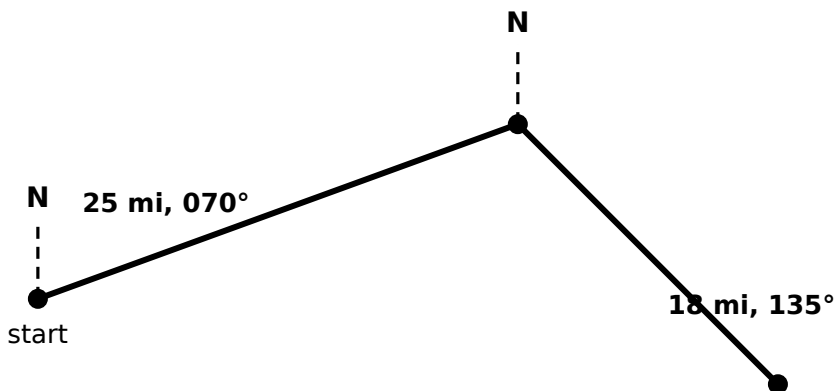
In triangle ABC , $a = 9$, $b = 13$ and $C = 71^\circ$. Find side c and then angle A , each to the nearest tenth.

Question 5 Ambiguous Case (2 points)

In triangle ABC , $A = 36^\circ$, $a = 7$ and $b = 10$. How many triangles are possible? Find the possible values of B .

Question 6 Navigation with Bearings (3 points)

A ship leaves a port and sails 25 miles on a bearing of 070° , then 18 miles on a bearing of 135° .



Path of the ship.

- a. Find the angle inside the triangle at the turning point. (1 point)
- b. Set up and compute the distance from the port. (1 point)
- c. Report the distance with one decimal. (1 point)

Question 7 Largest Angle (2 points)

A triangle has sides 8, 11 and 14. Find its largest angle to the nearest tenth of a degree.

Question 8 River Crossing Survey (3 points)

To find the width PQ of a river, a surveyor stands at R and measures $RP = 480$ feet, $RQ = 360$ feet and angle $PRQ = 41^\circ$. Find PQ to the nearest foot, and the area of triangle PQR to the nearest square foot.