

Geometry - Law of Sines and Law of Cosines - Worksheet

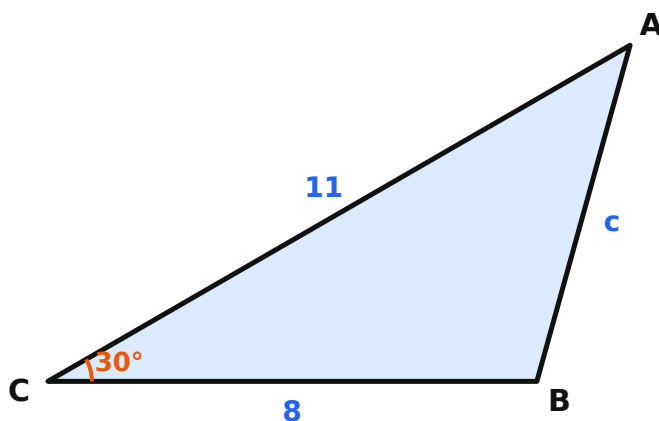
Common Core G-SRT.D.9, G-SRT.D.10, G-SRT.D.11 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice the area formula with sine, the Law of Sines and the Law of Cosines (Common Core G-SRT.D.9 to G-SRT.D.11). The first problems are quick one-step checks of the definitions and formulas from the lesson. The middle problems ask for diagrams, equations and careful reasoning in the style of a high school Geometry class. The last six problems are applications with lakes, ships, lookouts, roofs and lots.

Geometry · Common Core State Standards: **G-SRT.D.9, G-SRT.D.10, G-SRT.D.11**

Exercise 1 - Area from SAS



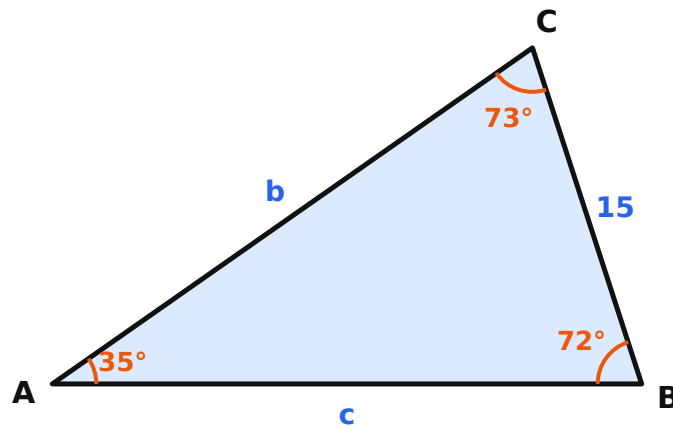
$$\text{Area} = (1/2)(8)(11) \sin 30^\circ = 22.$$

Two sides of a triangle are 8 and 11, and the angle between them is 30° . Find the area.

Exercise 2 - Area of a sail

A triangular sail has two edges of 7.5 meters and 12 meters with a 58° angle between them. Find the area of the sail to the nearest tenth of a square meter.

Exercise 3 - Law of Sines: find a side



Law of Sines: $a / \sin A = b / \sin B = c / \sin C$.

In triangle ABC, $A = 35^\circ$, $B = 72^\circ$ and $a = 15$. Find b to the nearest tenth.

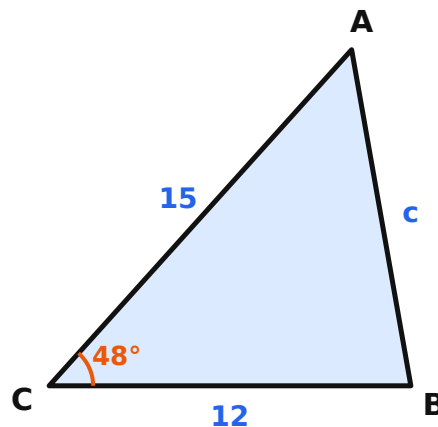
Exercise 4 - Law of Sines: find an angle

In triangle ABC, $a = 18$, $b = 15$ and $A = 50^\circ$. Find angle B to the nearest tenth. (Side b is shorter than a, so B is acute.)

Exercise 5 - ASA

In triangle ABC, $A = 52^\circ$, $B = 61^\circ$ and $c = 20$. Find angle C and side a to the nearest tenth.

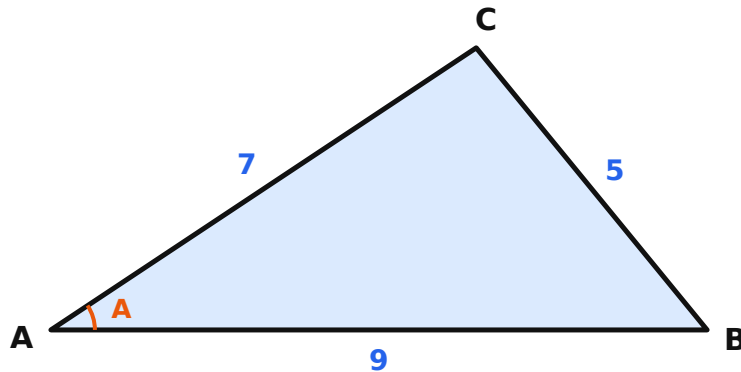
Exercise 6 - Law of Cosines: SAS



Two sides and the included angle.

Two sides of a triangle measure 12 and 15, and the angle between them is 48° . Find the third side c to the nearest tenth.

Exercise 7 - Law of Cosines: SSS



Given three sides, use the Law of Cosines to find an angle.

A triangle has sides 5, 7 and 9. Find the angle opposite the side of length 5 to the nearest tenth.

Exercise 8 - Obtuse angle

A triangle has sides 4, 5 and 8. Find the largest angle to the nearest tenth.

Exercise 9 - Right triangle check

Use the Law of Cosines to show that a triangle with sides 7, 24 and 25 is a right triangle.

Exercise 10 - Which law?

Choose the first step (Law of Sines or Law of Cosines) for each: (a) two angles and a side, (b) two sides and the included angle, (c) three sides, (d) two sides and an angle opposite one of them.

Exercise 11 - Solve a triangle (SAS)

In triangle ABC, $\alpha = 10$, $b = 12$ and $C = 40^\circ$. Find c , then angle A, then angle B. Round to the nearest tenth.

Exercise 12 - Angle opposite the shorter side

In triangle ABC, $A = 58^\circ$, $a = 22$ and $b = 18$. Side b is shorter than side a , so angle B is acute. Find the measure of angle B to the nearest tenth of a degree.

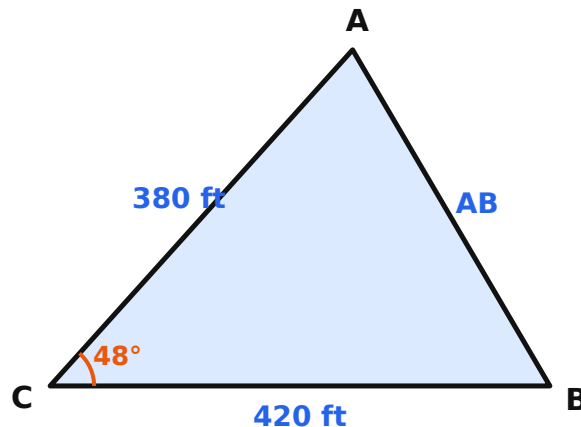
Exercise 13 - Equilateral triangle area

Find the area of an equilateral triangle with side 10 using $\frac{1}{2}ab\sin C$. Give an exact answer and a decimal.

Exercise 14 - Angle from area

A triangle has area 30 and two sides of 10 and 12 with an acute included angle. Find that angle.

Exercise 15 - Across a lake



Surveyors at C measure to A and B.

Ethan and Mei stand at A and B on opposite shores of a lake. From a point C, they measure $CA = 420$ feet, $CB = 380$ feet and angle $C = 48^\circ$. Find the distance AB across the lake to the nearest foot.

Exercise 16 - Ship's return

A ship leaves port and sails 40 miles. It turns so that the angle between its path out and its new path is 110° , and then sails 55 miles. How far is the ship from port, to the nearest mile?

Exercise 17 - Fire lookouts

Two lookouts are 800 feet apart. They sight the same fire at angles of 62° and 71° from the line joining them. Find the distance from the lookout with the 62° angle to the fire to the nearest foot.

Exercise 18 - Hikers apart

Two hikers leave the same camp on straight trails. One walks 5.4 km and the other walks 3.8 km, and the angle between the trails is 112° . How far apart are they at the end, to the nearest

tenth of a kilometer?

Exercise 19 - Garden lot cost

A triangular lot has two sides of 120 feet and 150 feet meeting at a 35° angle. Sod costs \$0.45 per square foot. Find the area and the cost of covering the lot with sod to the nearest dollar.

Exercise 20 - Order the sides

A triangle has angles of 35° , 65° and 80° . The side opposite the 35° angle is 6. Which side is longest? Find the other two sides to the nearest tenth.