Name: _____

Date: _____

Period: _____

Student Workbook

Law of Sines

Learning Target: I can use the Law of Sines to solve oblique triangles, including the ambiguous (SSA) case, and find their area.

Vocabulary

Term	Meaning
Oblique Triangle	A triangle that does NOT contain a right angle.
Law of Sines	a/sinA = b/sinB = c/sinC — relates each side to the sine of its OPPOSITE angle.
Ambiguous Case (SSA)	Given two sides and a non-included angle, there may be 0, 1, or 2 valid triangles.

Key Concept: Solving AAS/ASA Triangles

METHOD 1. Find the third angle (angles sum to 180°). 2. Use the Law of Sines to solve for each missing side.

EXAMPLE 1

Triangle with A=40°, B=60°, a=10. Find b and c.

C = 180° - 40° - 60° = _____

b = 10sin(60°)/sin(40°) ≈ _____ c = 10sin(80°)/sin(40°) ≈ _____

Key Concept: The Ambiguous Case (SSA)

WHY IT'S TRICKY When given two sides and a non-included angle, solving for the other angle using arcsin can give TWO possible angles (θ and 180°-θ). You must check whether each leads to a valid triangle (angle sum < 180°).

EXAMPLE 2

A=30°, a=5, b=8. How many triangles are possible?

sinB = 8sin(30°)/5 = _____ → B ≈ _____° or _____°
Check both: both give a valid third angle C > 0°, so there are _____ solutions.

COMMON MISTAKE

Always check BOTH possible angles from arcsin in an SSA problem! Forgetting the second angle (180°-θ) is the most common error — and sometimes that second triangle is invalid, which is just as important to notice.

Key Concept: Area of an Oblique Triangle

FORMULA Area = ½ab·sinC (using two sides and their INCLUDED angle)

EXAMPLE 3

Find the area of a triangle with a=7, b=9, C=50°.

Area = ½(7)(9)sin(50°) ≈ _____

Guided Practice — Part A: Solve the Triangle (Two Angles + Side)

A1 A=50°, B=70°, a=8. Find b and c.

A2 A=35°, C=95°, c=20. Find a and b.

Guided Practice — Part B: Solve the Triangle (Included Side)

B1 A=45°, C=65°, b=10. Find a and c.

B2 A=55°, B=60°, c=14. Find a and b.

Guided Practice — Part C: The Ambiguous Case

C1 A=30°, a=5, b=8. How many solutions are there?

C2 A=50°, a=10, b=6. How many solutions are there?

Guided Practice — Part D: Area of a Triangle

D1 a=6, b=10, C=40°. Find the area.

D2 a=9, b=12, C=65°. Find the area.

BEFORE YOU MOVE ON

Check with a partner: for SSA problems, did you check whether BOTH possible angles actually produce a valid triangle?