Section 7.1

Oblique Triangles and the Law of Sines

CONGRUENCY

Congruence Axioms

SAS **Side-Angle-Side**	If two sides and the included angle of one triangleare equal to two sides and the included angle ofanother triangle, then the triangles are congruent.
ASA **Angle-Side-Angle**	If two angles and the included side of one trangle areequal to two angles and the included side of a secondtriangle, then the triangles are congruent.
SSS **Side-Side-Side**	If three sides of one triangle are equal to three sidesof a second triangle, then the triangles are congruent.

In this section we will learn how to solve *oblique* triangles. An oblique triangle is a triangle that is *not* a right tirangle. With right triangles given any 2 pieces of information (not *both* angles) then we can find all other possible sides and angles. We would like to be able to do the same with oblique tirangles.

Law of Sines

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

Law of Sines Problems

Problem 1. Solve for traingle ABC if $A = 28.8°$, $C = 102.6°$, and $c = 25.3$ in.

Problem 2. Kurt Daniels wishes to measure the distance across the Gasconade River. He determines that $C = 117.2°$, $A = 28.8°$, and $b = 75.6$ ft. Find the distance a across the river.

Problem 3. The bearing of a lighthouse from a ship was found to be N 52° W. After the ship sailed 5.8 km due south, the new bearing was N 23° W. Find the distance to, to the nearest kilometer, between the ship and the lighthouse at each location.

Area of a Triangle

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The area of a triangle ABC is given by any one of the following formulas:

$$\textbf{Area} = \frac{1}{2}bc\sin A, \quad \textbf{Area} = \frac{1}{2}ab\sin C, \quad \text{and} \quad \textbf{Area} = \frac{1}{2}ac\sin B$$

Problem 4. Find the area of a triangle DEF where $f = 9.0\,\text{ft}$, $d = 12\,\text{ft}$ and $E = 127°$.

Problem 5. Find the area of a triangle ABC if $B = 58°\,10'$, $a = 32.5\,\text{cm}$, and $C = 73°\,30'$.