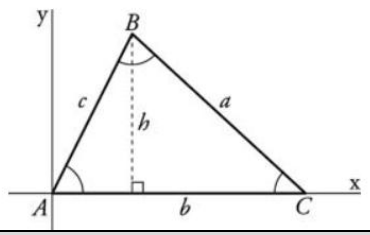
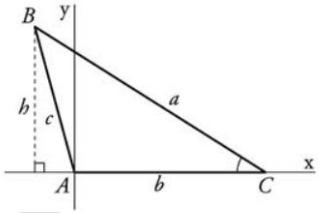
Core Content

Cluster Title: Apply trigonometry to general triangles
Standard G.SRT.9(+): Derive the formula *A = ½ ab sin(C)* for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
Concepts and Skills to Master
• Derive the formula *A = ½ ab sin(C)* for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

Supports for Teachers

Critical Background Knowledge	
• Trigonometric ratios • Area of a triangle	
Academic Vocabulary	
auxiliary line, vertex, perpendicular	
Suggested Instructional Strategies	**Resources**
• Derive the formula for the area of a triangle using the figures below.   	
Sample Formative Assessment Tasks	
Skill-Based Task: The two sides of a triangle are 4 cm and 5 cm, and the included angle is 32 degrees. Find the area of the triangle.	**Problem Task:** Express the area of any triangle in terms of the sides and angles.

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Core Content

Cluster Title: Apply trigonometry to general triangles.
Standard G.SRT.10(+): Prove the Laws of Sines and Cosines and use them to solve problems.
Concepts and Skills to Master
• Prove the Law of Sines. • Prove the Law of Cosines. • Use the Law of Sines and the Law of Cosines to solve problems.

Supports for Teachers

Critical Background Knowledge	
• Right-triangle trigonometry	
Academic Vocabulary	
included angle, opposite side, opposite angle	
Suggested Instructional Strategies	**Resources**
• Explore different ways to prove the Law of Cosines and the Law of Sines. • Using Geometer's Sketchpad, verify the Law of Sines and the Law of Cosines.	
Sample Formative Assessment Tasks	
Skill-Based Task: Write a paragraph proof of the Law of Sines.	**Problem Task:** Derive the Law of Sines from the formula for the area of a non-right triangle.

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Core Content

Cluster Title: Apply trigonometry to general triangles
Standard G.SRT.11(+): Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).
Concepts and Skills to Master
• Use the Law of Sines or the Law of Cosines to find unknown measures in triangles.

Supports for Teachers

Critical Background Knowledge	
• Use inverse trigonometric functions to find angle measures.	
Academic Vocabulary	
ambiguous case	
Suggested Instructional Strategies	**Resources**
• Help students establish criteria for using Law of Cosines or the Law of Sines. • Use context problems for construction and other careers.	
Sample Formative Assessment Tasks	
Skill-Based Task: Find all the measurements in triangle *ABC*, given $C = 62°$, $A = 17°$, and $a = 1$ inch. Find all the measurements in triangle *ABC*, given $a = 20$, $c = 24$, and $B = 47°$	**Problem Task:** A radio station located adjacent to I-15 is 10 miles from where it connects to I-70. The angle between the two interstates is 48°. The station can broadcast for a range of 7 miles. If Bryce is driving on I-70, between what two distances from the intersection of the two highways can he receive the radio signal?

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