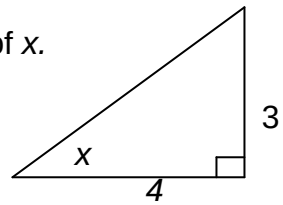
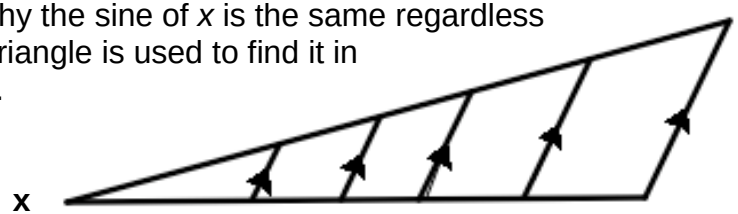
Core Content

Cluster Title: Define trigonometric ratios and solve problems involving right triangles.
Standard G.SRT.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
Concepts and Skills to Master
• Understand that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles. • Define sine, cosine, and tangent as the ratio of sides in a right triangle.

Supports for Teachers

Critical Background Knowledge	
• Understand that corresponding angles of similar triangles are congruent and ratios of corresponding sides are equal.	
Academic Vocabulary	
similar triangles, ratio, right triangle	
Suggested Instructional Strategies	**Resources**
• Use special triangles to develop the concept of trigonometric ratios. • Use interactive geometry software to produce tables demonstrating the equivalence of ratios formed by the measures of corresponding sides of similar triangles.	
Sample Formative Assessment Tasks	
Skill-Based Task: Find the sine, cosine, and tangent of *x.*  	**Problem Task:** Explain why the sine of *x* is the same regardless of which triangle is used to find it in the figure. 

Core Content

Cluster Title: Define trigonometric ratios and solve problems involving right triangles.
Standard G.SRT.7: Explain and use the relationship between the sine and cosine of complementary angles.
Concepts and Skills to Master
• Demonstrate the relationship between sine and cosine in the acute angles of a right triangle. • Explain the relationship between the sine and cosine in complementary angles.

Supports for Teachers

Critical Background Knowledge	
• Understand that the acute angles of a right triangle are complementary. • Know the right triangle definitions of sine and cosine.	
Academic Vocabulary	
complementary angles, sine, cosine.	
Suggested Instructional Strategies	**Resources**
• Use a properly labeled right triangle to demonstrate that acute angles are complementary and, by definitions of their ratios, the $\sin(\theta) = \cos\left(90^0 - \theta\right)$ *and* $\cos\left(\theta\right) = \sin\left(90^0 - \theta\right)$.	
Sample Formative Assessment Tasks	
Skill-Based Task: Find the second acute angle of a right triangle given that the first acute angle has measure of 39^0. Complete the following statement: If $\sin 30^0 = ½$, then the cos ____ = ½.	**Problem Task:** Find: $\sin A, \sin B, \cos A, \cos B$

Core Content

Cluster Title: Define trigonometric ratios and solve problems involving right triangles.
Standard G.SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
Concepts and Skills to Master
• Use the Pythagorean Theorem and trigonometric ratios to find missing measures in triangles in contextual situations.

Supports for Teachers

Critical Background Knowledge	
• Apply the Pythagorean Theorem in real-world and mathematical problems in two and three dimensions (8.G.7). • Apply right triangle trigonometric ratios to solve right triangles (II.G.SRT.6).	
Academic Vocabulary	
Pythagorean Theorem, sine, cosine, tangent, angle of elevation, angle of depression	
Suggested Instructional Strategies	**Resources**
• Demonstrate angles of elevation and depression with a laser pointer. • Use a hypsometer to measure the height of a building or other tall object.	
Sample Formative Assessment Tasks	
Skill-Based Task: A teenager whose eyes are 5’ above ground level is looking into a mirror on the ground and can see the top of a building that is 30’ away from the teenager. The angle of elevation from the center of the mirror to the top of the building is 75°. How tall is the building? How far away from the teenager’s feet is the mirror?	**Problem Task:** While traveling across flat land, you see a mountain directly in front of you. The angle of elevation to the peak is 3.5°. After driving 14 miles closer to the mountain, the angle of elevation is 9°24’36”. Explain how you would set up the problem, and find the approximate height of the mountain.