

Mathematics
Topics in Algebra and Geometry
Unit 9: Right Triangles

Essential Understandings	<ul style="list-style-type: none"> ▪ Right triangles have many real-world applications.
Essential Questions	<ul style="list-style-type: none"> ▪ What is a square root? ▪ How are square roots simplified? ▪ What is a right triangle? ▪ What are the special right triangles? ▪ What are the properties of right triangles? ▪ What are the properties of the special right triangles? ▪ What are the three trigonometric ratios? ▪ How can the three trigonometric ratios and the Pythagorean Theorem be applied in real-life situations?
Essential Knowledge	<ul style="list-style-type: none"> ▪ The radical symbol always indicates the nonnegative square root of a number. ▪ One can use the Product Property of Radicals to multiply and simplify radical expressions. ▪ In a 45 degree -45 degree -90 degree triangle, the length of the hypotenuse is the length of a leg times the square root of 2. ▪ The Pythagorean Theorem can be used to find the length of the hypotenuse of any 45 degree – 45 degree – 9- degree triangle. ▪ In a 30 degree – 60 degree – 90 degree triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is the length of the shorter leg time the square root of 3. ▪ The Pythagorean Theorem states that in a right triangle, the square of the hypotenuse is equal to the sum of the square of the legs. ▪ The tangent of an angle is equal to the leg opposite the angle divided by the leg adjacent to the angle. ▪ The sine of an angle is equal to the leg opposite the angle divided by the hypotenuse of the angle. ▪ The cosine of an angle is equal to the leg adjacent to the angle divided by the hypotenuse of the angle.
Vocabulary	<ul style="list-style-type: none"> ▪ <u>Terms:</u> <ul style="list-style-type: none"> ○ leg, hypotenuse, opposite leg, adjacent leg, sine ratio, cosine ratio, tangent ratio, angle of elevation, angle of depression, the Pythagorean Theorem, the 45-45-90 theorem, the 30-60-90 theorem, radical, radicand, trigonometric ratio leg opposite and angle, inverse functions and leg adjacent to the angle

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Essential Skills	<ul style="list-style-type: none"> ▪ Simplify radicals. ▪ Find the side lengths of 45 degree – 45 degree – 90 degree triangles. ▪ Find the side lengths of 30 degree – 60 degree – 90 degree triangles. ▪ Find the tangent of an acute angle. ▪ Find the sine and cosine of an angle. ▪ Solve a right triangle.
Related Maine Learning Results	<p><u>Mathematics</u> C. Geometry Geometric Figures C3.Students understand and use basic ideas of trigonometry.</p> <ol style="list-style-type: none"> a. Identify and find the value of trigonometric ratios for angles in right triangles. b. Use trigonometry to solve for missing lengths in right triangles. c. Use inverse trigonometric functions to find missing angles in right triangles.
Sample Lessons And Activities	<ul style="list-style-type: none"> ▪ Students will use the A++ Learning Program in our computer lab to explore special right triangles.
Sample Classroom Assessment Methods	<ul style="list-style-type: none"> ▪ Students will take the computer assessments aligned with the A++ Learning Program on special right triangles.
Sample Resources	<ul style="list-style-type: none"> ▪ <u>Publications:</u> <ul style="list-style-type: none"> ○ <u>Geometry</u>, Jurgensen, Brown, Jurgensen (McDougal Littell) ○ <u>Geometry: Concepts and Skills</u>, Larson, Boswell, Stiff ((McDougal Littell) ▪ <u>Other Resources:</u> <ul style="list-style-type: none"> ○ Scientific Calculator