

RRRPS District Standards: MATHEMATICS

Trigonometry

June 2008

STRAND III: GEOMETRY AND TRIGONOMETRY

NM State Content Standard III (V): Guidance for further study:

NM State Benchmarks Grades 9-12

NM State Benchmark III-A: Grades 9-12

Represent and graph trigonometric functions and understand how they model real world situations.

NM Trigonometry Performance Standards

1. Graph all six trigonometric functions using radian measure, their domains and ranges and the exact values of the five angles of the six trigonometric functions.
2. Demonstrate an understanding of trigonometric functions as circular functions using symmetry.
3. Solve trigonometric equations.
4. Verify trigonometric identities.
5. Apply trigonometric functions to solve physical problems, including the use of the laws of sines and cosines.
6. Demonstrate the use of sine, cosine, and tangent as a similarity ratio to solve real-world right triangle problems.
7. Understand the relationship of co-functions, and the relationship between complementary and supplementary angles.
8. Apply the Pythagorean theorem to determine trigonometric function values.
9. Use the trigonometric functions to solve right triangles (e.g., "If two sides of a triangle are 8 and 5, and the angle between them is 35 degrees, find the rest of the angles and sides.")
10. Know and use 30-60-90 and 45-45-90 triangle relationships and how they are related to trigonometric values for 30, 45, and 60 degrees.
11. Quick recall of basic trigonometric values for the five common reference angles in all four quadrants.

RRPS Trigonometry Power Standards

While all benchmark standards are taught, Power Standards are consistently emphasized and regularly assessed.

Power Standard 1 (Benchmark III-A)

Graph all six trigonometric functions using radian measure, their domains and ranges and the exact values of the five angles of the six trigonometric functions.

Power Standard 2 (Benchmark III-A)

Solve trigonometric equations.

Power Standard 3 (Benchmark III-A)

Verify trigonometric identities.

Power Standard 4 (Benchmark III-A)

Quick recall of basic trigonometric values for the five common reference angles in all four quadrants.

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NM State Benchmark III-B: Grades 9-12

Understand the basic use of vectors and their representations in the real world and how trigonometry is used to calculate physical phenomena such as force and work.

NM Trigonometry Performance Standards

1. Write the component form of the vector.
2. Understand vector operations, unit vectors, direction angles, and the applications of vectors.
3. Know how to find the dot-product of vectors, the angle between two vectors, finding vector components and calculate work.
4. Apply the concepts of vector representation in real-world situations and be able to solve force and work problems, (e.g., Forces with magnitudes of 150 Newton's and 220 Newton's acting on a hook. The angle between the two forces is 30° . (Find the direction and the magnitude of the resultant of these forces.)
5. Apply the concepts of vectors to solve problems in the navigation fields. (e.g., An airplane is flying in the direction $S 32^\circ E$, with an airspeed of 875 kilometers per hour. Because of the wind, its ground speed and direction are 800 kilometers per hour and $S 40^\circ E$, respectively. Find the direction and magnitude of the wind).

NM State Benchmark III -C: Grades 9-12

Recognize the equation of a circle.

NM Trigonometry Performance Standards

1. Recognize the equation of a circle.
2. Determine the radius of a circle and draw the graph of a circle with its center at the origin.
3. Write the equation of a circle given a verbal description or a graph with its center at the origin and a given point on the graph.

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NM State Content Standard III (V): Guidance for further study:

NM State Benchmarks Grades 9-12

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NM State Benchmark III-D: Grades 9-12

Use visualization, spatial reasoning, and geometric modeling to solve problems.

NM Trigonometry Performance Standards

1. Understand and use elementary relationships of basic trigonometric functions defined by the angles of a right triangle. (e.g., “What is the radius of a circle if a regular octagon with side lengths of two feet is inscribed within it?”)
2. Use trigonometric functions to solve for the length of the second leg of a right triangle given the angles and the length of the first leg. (e.g., “A surveyor determines that the angle subtended by a two-foot stick at right angles to his transit is exactly one degree. What is the distance from the transit to the base of the measuring stick?”)