Pythagorean Theorem

A squared plus b squared equals c squared.

The diagram is a right triangle with sides of a and b with a hypotenuse of c

Example Problem

The diagram is a right triangle with sides of x and 4 with a hypotenuse of 5.

4 squared plus x squared = 5 squared. 16 plus x squared equals 25 so x = 3

You try

a. Sine of 37 degrees equals 0 point 6018
b. cosine of 45 degrees equals 0 point 7071

You try

a. sine of angle theta equals 0 point 8764 so the angle theta equals 61 point 2 degrees
b. cosine of angle theta equals 0 point 2345, so the angle theta equals 76 point 4 degrees

You try

The diagram is a right triangle with vertices labeled A B and C with C being the right angle. Side BC equals 25 feet, side AB equals c.   The sine of angle 32 equals the fraction 25 over c. c equals the fraction 25 over sine of 32 degrees which equals 47 point 2 feet

Practical Problems

1. The diagram is a right triangle with one angle equal to 42 degrees, one side equal to x and the hypotenuse equal to 7 point 2.

The cosine of 42 degrees equals the fraction x over 7 point 2. X equals 7 point 2 times cosine of 42 degrees which equals 5 point 35

2. The diagram is a right triangle with one angle equal to 52 degrees, one side equal to x and the other side equal to 4 point 2.

The tangent of 52 degrees equals the fraction equals the fraction x over 4 point 2. X = 4 point 2 times the tangent of 52 degrees which equals 5 point 38.

3. The diagram is a right triangle with one angle equal to theta degrees, one side equal to 2 point 7 and the hypotenuse equal to 5 point 4.

The sine of angle theta equals the fraction 270 over 5 point 4. Angle theta equals the inverse sine of the fraction 2 point 7 over 540 which equal 30 degrees

Practical problems

1a. 5 squared plus 12 squared equals x squared. 25 plus 144 equals x squared. X = 13

1b. The tangent of angle theta equals the fraction 4 over 4. Angle theta equals the inverse tangent of the fraction 4 over 4 which equals 45 degrees

1c. The sine of 25 degrees equals the fraction x over 10. X equals 10 times the sine of 25 degrees, so x equals 4 point 23

1d. The cosine of 17 degrees equals the fraction 9 point 21 over x. x equals the fraction 9 point 21 over cosine of 17 degrees so x equals 9 point 63.

2. The tangent of 42 degrees equals the fraction 6 over 4. r equals the fraction 6 over tangent of 42 degrees which equals 6 point 66. 6 point 66 represents the radius of the cone.

The sine of 42 degrees equals the fraction of 6 over s. s equals the fraction 6 over the sine of 42 degrees so s equals 8 point 97. 8 point 97 represents the slant height for the cone.

The surface area of the cone equals the lateral area plus the area of the circular base. Surface area equals the number pi times 6 point 66 times 8 point 97 plus the number pi times 6 point 66 squared. Surface area equals 327 feet squared

Volume equals 1 over 3 times the number pi times 6 point 66 squared times 6. Volume equals 278 point 7 feet cubed