

The Pythagorean Theorem

A right triangle is a triangle with an angle of 90° . The two sides that form the right angle are called legs. The side opposite the right angle is the hypotenuse.



The Pythagorean Theorem

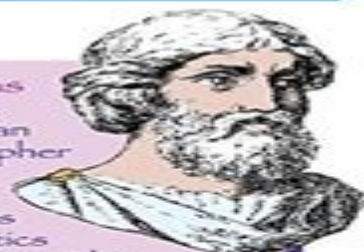
- Pythagoras was one of the first mathematicians to recognize the relationship between the sides of a right triangle. This special relationship forms the Pythagorean Theorem.
- The Pythagorean Theorem states that the sum of the squares of the legs of a right triangle equals the square of the length of the hypotenuse.
- According to the Pythagorean Theorem, the sum of the two green squares, is equal to the area of the blue square.

- Area of square **A** = a^2
- Area of square **B** = b^2
- Area of square **C** = c^2

Therefore in algebraic terms, the Pythagorean Theorem is stated as:

$$a^2 + b^2 = c^2$$

Pythagoras was a Greek mathematician and philosopher who made important contributions to mathematics and astronomy. The Pythagorean Theorem was Pythagoras' most famous mathematical contribution.



Using the Pythagorean Theorem



Find the length of the hypotenuse (**C**).

$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$25 = c^2$$

$$\sqrt{25} = \sqrt{c^2}$$

$$5 = C$$

Substitute for the known variables.

Take the square root of both sides.

The length of the hypotenuse is 5cm.



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Facing Math The Pythagorean Theorem

J Rink



Facing Math The Pythagorean Theorem:

The Pythagorean Theorem Workbook Maria Miller, 2017-01-10 This is a relatively short workbook focusing on the Pythagorean Theorem and its applications The Pythagorean Theorem is actually not part of the Common Core Standards for seventh grade The Common Core places it in eighth grade However I have included it in this curriculum because it is a traditional topic in pre algebra That way Math Mammoth Grade 7 works as a full pre algebra curriculum while fully meeting and exceeding the Common Core Standards for grade 7 First students need to become familiar with square roots so they can solve the equations that result from applying the Pythagorean Theorem The first lesson of the workbook introduces taking a square root as the opposite operation to squaring a number The lesson includes both applying a guess and check method and using a calculator to find the square root of a number Next students learn how to solve simple equations that include taking a square root This makes them fully ready to study the Pythagorean Theorem and apply it The Pythagorean Theorem is introduced in the lesson by that name Students learn to verify that a triangle is a right triangle by checking if it fulfills the Pythagorean Theorem They apply their knowledge about square roots and solving equations to solve for an unknown side in a right triangle when two of the sides are given Next students solve a variety of geometric and real life problems that require the Pythagorean Theorem This theorem is extremely important in many practical situations Students should show their work for these word problems to include the equation that results from applying the Pythagorean Theorem to the problem and its solution There are literally hundreds of proofs for the Pythagorean Theorem In this workbook we present one easy proof based on geometry not algebra As an exercise students are asked to supply the steps of reasoning to another geometric proof of the theorem and for those interested the lesson also provides an Internet link that has even more proofs of this theorem

The Pythagorean Theorem Merle A. Barlow, 2016-02-05 Pythagoras a famous Greek scholar sathematician and philosopher formulated a proof for a theorem that is named for him the Pythagorean theorem This theorem states that in any right triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides The Pythagorean theorem for right angled triangles likely was known long before the time of Pythagoras It was probably used by the ancient Egyptians to construct the pyramids The theorem is quite believable without rigorous proof to anyone willing to expend a modest effort in some experimentation One method is to draw a number of right angled triangles in as wide a variety as practicable and measure all of the sides It will be determined that for each triangle drawn the square of the length of the side opposite the right angle is about equal to the sum of the lengths of the squares of the other two sides Another method requires the availability of a balance For this more interesting experiment construct a right angled triangle and a square on each side using a piece of sheet metal or cardboard Then cut out the three squares and weigh them on the balance The square on the hypotenuse should balance the other two Contained within this book are some rigorous proofs and some interesting perspectives regarding right angles and right angled triangles Doubtless this theorem is one of the most useful

concepts in mathematics **The Pythagorean proposition; its proofs analyzed and classified and** Elisha Scott Loomis,1927 **Looking for Pythagoras** ,2004 Contains a complete eighth grade mathematics curriculum with connections to other subject areas *The Pythagorean Theorem* Alfred S. Posamentier,2010-06-22 The Pythagorean theorem may be the best known equation in mathematics Its origins reach back to the beginnings of civilization and today every student continues to study it What most nonmathematicians don't understand or appreciate is why this simply stated theorem has fascinated countless generations In this entertaining and informative book a veteran math educator makes the importance of the Pythagorean theorem delightfully clear He begins with a brief history of Pythagoras and the early use of his theorem by the ancient Egyptians Babylonians Indians and Chinese who used it intuitively long before Pythagoras's name was attached to it He then shows the many ingenious ways in which the theorem has been proved visually using highly imaginative diagrams Some of these go back to ancient mathematicians others are comparatively recent proofs including one by the twentieth president of the United States James A Garfield After demonstrating some curious applications of the theorem the author then explores the Pythagorean triples pointing out the many hidden surprises of the three numbers that can represent the sides of the right triangle e g 3 4 5 and 5 12 13 And many will truly amaze the reader He then turns to the Pythagorean means the arithmetic geometric and harmonic means By comparing their magnitudes in a variety of ways he gives the reader a true appreciation for these mathematical concepts The final two chapters view the Pythagorean theorem from an artistic point of view namely how Pythagoras's work manifests itself in music and how the Pythagorean theorem can influence fractals The author's lucid presentation and gift for conveying the significance of this key equation to those with little math background will inform entertain and inspire the reader once again demonstrating the power and beauty of mathematics *Looking for Pythagoras: The Pythagoras Theorem* Glenda Lappan,James T. Fey,William M. Fitzgerald,2007-12 By Grade 8 your child has probably grown accustomed to wrestling with a heavy backpack Let Pearson help lighten the load You can purchase school materials for home use at Pearson home **The Pythagorean Proposition** Elisha Scott Loomis,1968 **The Pythagorean Theorem** Eli Maor,2007

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