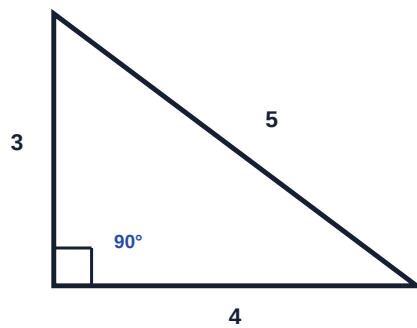


Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

The theorem and its parts

In a right triangle, the hypotenuse is opposite the right angle. If the legs are a and b and the hypotenuse is c, then a squared plus b squared equals c squared.



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

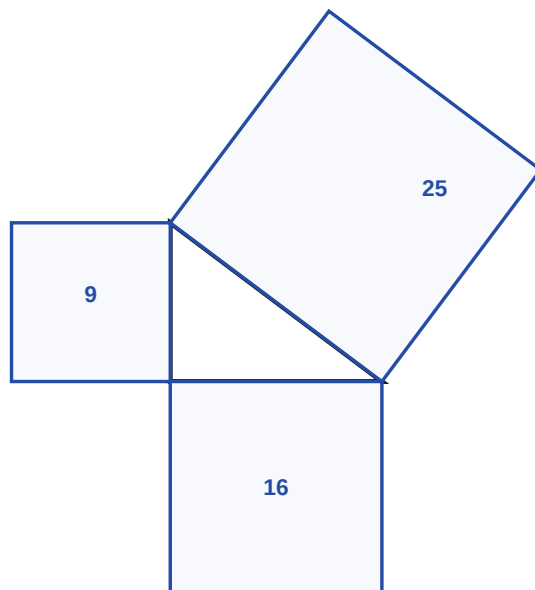
For legs 3 and 4, the hypotenuse is 5.

Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

Squares on the three sides

A square built on each side has area equal to that side length squared. The two leg-square areas add to the hypotenuse-square area.



$$A(a) + A(b) = A(c)$$

$$9 + 16 = 25$$

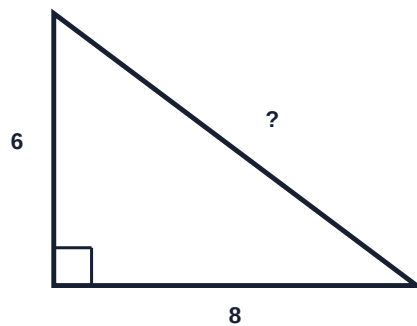
Areas 9 and 16 combine to make area 25.

Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

Finding the hypotenuse

Square both legs, add, and take the positive square root. A length cannot be negative.



$$c^2 = 6^2 + 8^2$$

$$c^2 = 36 + 64 = 100$$

$$c = \sqrt{100} = 10$$

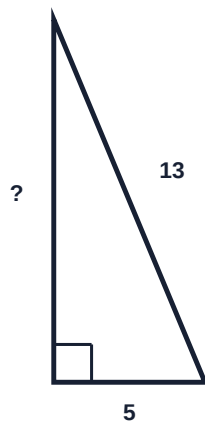
With legs 6 and 8: c squared is 36 plus 64, so c is 10.

Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

Finding a leg

Start with the hypotenuse square and subtract the known leg square. Then take the positive square root.



$$a^2 = 13^2 - 5^2$$

$$a^2 = 169 - 25 = 144$$

$$a = \sqrt{144} = 12$$

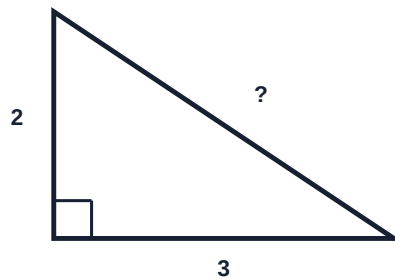
With c equal to 13 and one leg 5: the other leg is 12.

Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

Irrational lengths and rounding

Some radicands are not perfect squares. Keep the exact root during the work, then round only the final length to four decimal places.



$$c^2 = 2^2 + 3^2 = 13$$

$$c = \sqrt{13} \sim 3.6056$$

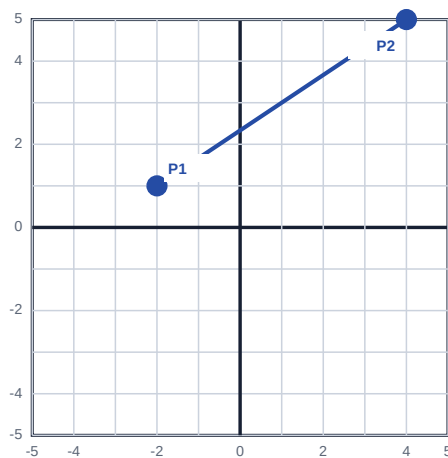
With legs 2 and 3, the exact length is the positive root of 13, approximately 3.6056.

Pythagorean Theorem Reference

Use these six pages to connect right triangles, square areas, unknown sides, irrational roots, and coordinate distance.

Distance on a coordinate plane

Horizontal and vertical distances are absolute differences. They form the legs of a right triangle between the two points.



$$dx = 4 - (-2) = 6$$

$$dy = 5 - 1 = 4$$

$$d^2 = 6^2 + 4^2 = 52$$

$$d = \sqrt{52} \sim 7.2111$$

From (-2, 1) to (4, 5), the leg lengths are 6 and 4; the distance is the positive root of 52, approximately 7.2111.