

Pythagorean Relationship

1. Suppose that m and n are two positive integers such that m is less than n .

a) Draw a table similar to the one shown.

m	n	$n^2 - m^2$	$2mn$	$n^2 + m^2$

b) Let $m = 3$ and $n = 4$. Determine the values in the last three columns.

c) Show that the numbers in the last three columns satisfy the Pythagorean relationship.

d) Select other values for m and n . Show that they generate Pythagorean triples.

e) Can you find values for m and n that do not generate a Pythagorean triple? Explain.

2. Investigate if the Pythagorean relationship works for shapes other than squares.

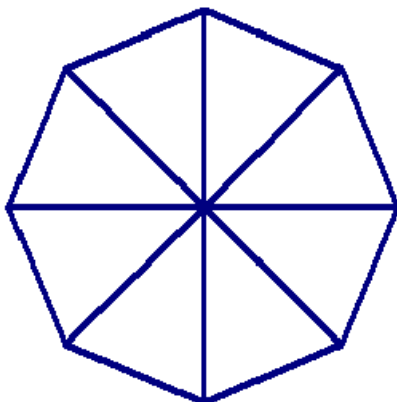
a) Use pencil and square dot paper or geometry software to draw a right triangle.

b) Draw a semicircle on each side of the triangle, such that the radius of the semicircle is half of the length of the side.

c) Determine the areas of the three semicircles. Does the Pythagorean relationship still hold?

d) Repeat the investigation using equilateral triangles on each side of the right triangle.

To explore the Pythagorean relationship for shapes other than squares, follow the web links on the same page where you found this file on the *MathLinks 8* Online Learning Centre.



3. Ivanka is planning to build a deck in the shape of a regular octagon. The distance from the centre to one of the vertices will be 2 m.

a) Use the Pythagorean relationship repeatedly to determine the approximate length of one of the sides of the octagon. Hint: Draw an octagon. Then, join the first vertex to the third vertex.

- b)** Use pencil and square dot paper or geometry software to model the deck. Measure the length of a side, and compare it to your answer in part a).