

Pythagorean Triplets**Pythagorean Theorem: $X^2 + Y^2 = C^2$**

Method 1			Method 2			
X	Y	C	X	Y	C	
Odd #'s	$\frac{1}{2}(X^2 - 1)$	$Y + 1$	N	4N	$4N^2 - 1$	$Y + 2$
3	4	5	1	4	3	5
5	12	13	2	8	15	17
7			3	12		
9			4	16		
11			5	20		

This activity can be presented on many levels. The versions below progress from easiest to more advanced.

Definitions: The Pythagorean Theorem states that the sides X, Y, and C (the largest side) of a right triangle are related by the formula above. A Pythagorean Triplet is a group of three whole numbers that satisfy the Pythagorean Theorem and can be the sides of a right triangle. If you multiply the numbers in a triplet by 2, 3, or any number, you will get another triplet; for now, we are only interested in the distinct triplets that are not multiples of another triplet.

Activities (easiest to advanced):

1. Give several triplets and confirm that the theorem is true.
2. Can you find other triplets that work?
3. Give the two formulas above that can generate triplets. Generate some new rows and confirm that the triplets work in the theorem.
4. Using algebra, show that the two formulas will always work.
5. Give examples of the two types of triplets. Figure out the formulas.
6. Advanced: Is there some way to illustrate why the formulas work with a diagram or something more intuitive?
7. Are there any more formulas to generate the triplets? Do these formulas cover all triplets.
8. The first triplets from each formula are the same; are there any other duplicates?