THE PYTHAGOREAN SPIRAL PROJECT

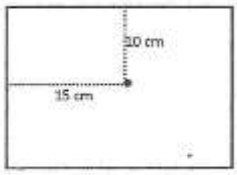
A Pythagorean Spiral is a series of right triangles arranged in a spiral configuration such that the hypotenuse of one right triangle is a leg of the next right triangle. In this project, you will use your knowledge of the Pythagorean theorem to find the lengths of the sides of each of the 17 right triangles that make up one revolution of the spiral. Finally you will decorate your spiral in a unique and creative way.

Materials:
- 1 Piece White Computer Paper
- Pencil
- Ruler
- Colored Pencils/Markers

How to Construct a Pythagorean Spiral:

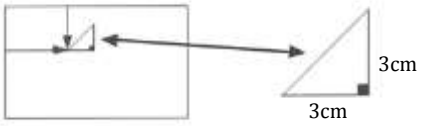
STEP 1: Beginning In The Correct Location

Place the computer paper in landscape orientation. With the paper in this position measure from the top left hand corner, 15 cm to the right and 10 cm down. This will be the starting point for your diagram. This position is crucial to placing the full diagram on the paper.



STEP 2: Placing The Triangle

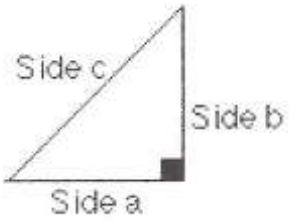
Using your ruler create a right triangle starting at the above location. To the left of your starting point trace a horizontal line 3 cm long. Then again starting at your starting point, draw a vertical line 3 cm long. The base of the triangle needs to be parallel with the top and bottom of the paper. Once the two legs of the triangle have been drawn, connect them together forming the hypotenuse. The lengths of the sides of the original triangle should be as shown below:



STEP 3: Calculate The Hypotenuse's Length

Using the Pythagorean theorem calculate the length of the hypotenuse. Do the calculations on a separate piece of paper and then place the *reduced answer* on the hypotenuse. All answers must be in their most reduced forms!!! I will do the first one for you.

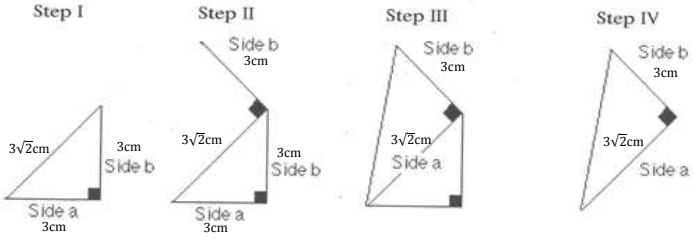
a = 3 cm b = 3 cm



$a^2 + b^2 = c^2$
$(3)^2 + (3)^2 = c^2$
$9 + 9 = c^2$
$18 = c^2$
$\sqrt{18} = c$
$\sqrt{9 \times 2} = c$
$3\sqrt{2} = c$

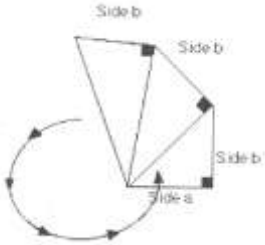
STEP 4: Beginning The Spiral Effect

(Step I) Using that hypotenuse of the triangle that you just created, form a new right triangle on top of the previous hypotenuse. (Step II) Create a new side "b" on the old triangle such that it is 90° degrees to the old hypotenuse and 3 cm in length. (Step III) Connect the new side "b" to the center location. (Step IV) Thus forming the next right triangle in the Spiral.



STEP 5: Keep Going

Return to Step 3 to calculate the newly created triangle's hypotenuse. Continue the process 17 times.



STEP 6: Coloring The Pattern

Detail your Pythagorean Spiral with a pattern. The pattern should be consistent with the pattern created by the spiral. BE CREATIVE!!!!

HELPFUL HINTS:

- Complete the assignment in pencil first, and then sharpen up the lines using a black marker.
- When labeling the diagram PRINT CLEARLY.
- Use color and creativity to make the spiral pattern.
- Effort and creativity is rewarded!!!

Project will be due on _____. You will turn in:

- The decorated Pythagorean Spiral
- The calculations for the length of each side of each triangle (on a separate sheet of paper and also on the spiral)
- This page with your name on it

Name: _____ Block: _____

Grading Rubric for Pythagorean Spiral Project

Number of Points	**Constructions**	**Calculations for each hypotenuse**	**Creativity**
10	Evidence of each construction shown and there are 17 triangles.	**All work is shown using the Pythagorean Theorem and each answer is simplified.**	The spiral is creatively colored and decorated.
7	Evidence of each construction is shown but there are not 17 triangles.	All work is shown using the Pythagorean Theorem but some answers are not properly simplified.	The spiral is colored but the results are not neat and it is clear that little effort was given.
5	Partial or incorrect constructions shown.	All work is shown but with errors in calculations and/or simplifications.	The spiral is partially colored or incomplete.
2	Construction markings are not visible.	Only partial work is shown and/or no evidence of the Pythagorean Theorem.	The spiral is not colored or decorated.
Your Score:			

Your grade on the Pythagorean Spiral Project is: