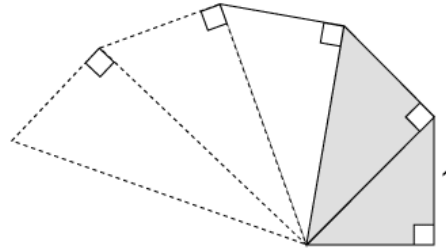


The Pythagorean Spiral Project

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 compass constructions to create the Pythagorean spiral. Then 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.

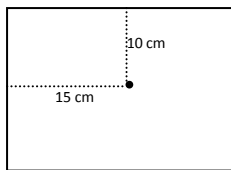
The first few triangles in a Pythagorean spiral will look like this:



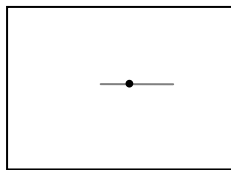
How to Construct a Pythagorean Spiral:

The first triangle in a Pythagorean Spiral is an isosceles right triangle. You will start your Pythagorean Spiral by constructing an isosceles right triangle whose legs measure 2 cm near the center of your piece of paper.

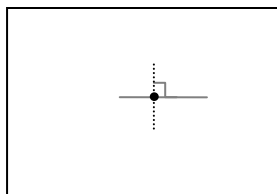
Step 1: Place the paper in landscape orientation. Draw a point approximately 15 cm to the right and 10 cm down from the top left corner of the piece of paper. This will be the starting point for your diagram. It will assure that your spiral stays on the page.



Step 2: Using your straight edge to draw a line through the point that is roughly horizontal (it does not have to be perfect).

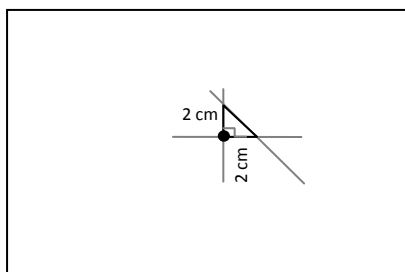


Step 3: Construct the line perpendicular to the line you just drew through the starting point using a compass & straightedge. Leave your construction marks.

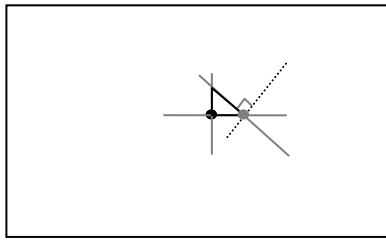


Skill: construct a line perpendicular to a line through a given point on the line.

Step 4: Use your ruler to measure 2 cm from the point on each of the perpendicular lines and use your straight edge to create a right, isosceles triangle. (Hint: make the hypotenuse a little longer than you need it to be. You will be creating a line perpendicular to the hypotenuse next and you will need a longer line)

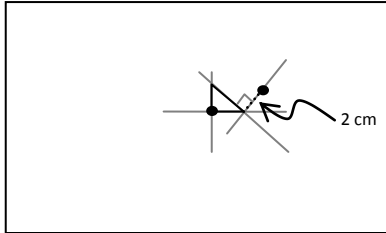


Step 5: Now, *construct* a line perpendicular to the hypotenuse through the point that is the rightmost vertex of the triangle.

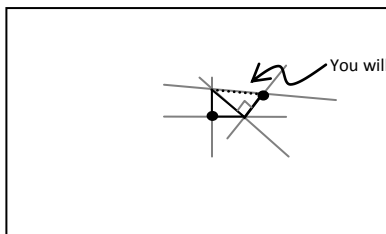


Skill: construct a line perpendicular to a line through a given point on the line.

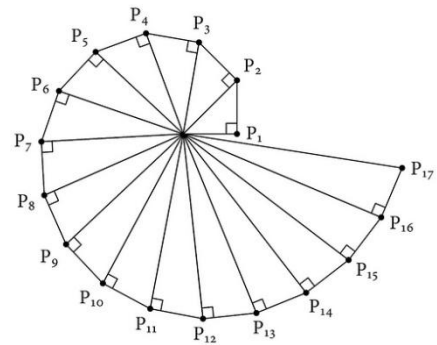
Step 6: Using your ruler measure 2cm from the vertex on the perpendicular line.



Step 7: Use your straight edge to draw in the new hypotenuse (hint: make it longer than it needs to be)



Repeat steps 5 – 7 until your spiral is complete. (There should be 17 triangles)



Finally, decorate your spiral in a unique, colorful, and creative way.

Name: _____

Section: _____

Due Date: March 31, 2015**Required components to be turned in:**

- The decorated Pythagorean Spiral,
 The calculations for the length of each side of each triangle (either on separate sheet or on the sheet with the spiral)

Example for 1st triangle A: $2^2+2^2=c^2$

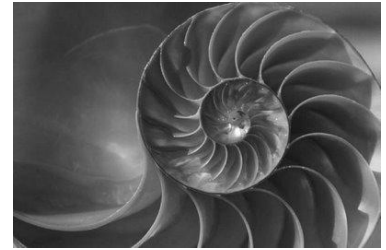
$$4 + 4 = c^2$$

$$8=c^2$$

$$c=\pm\sqrt{8} \text{ (reject negative)}$$

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

- This page with your name on it.

**Grading Rubric for Pythagorean Spiral Project**

Number of Points	Use of Compass Constructions	Calculations for each hypotenuse	Creativity
3	Evidence of each correct compass construction shown and there are 17 triangles	All work is shown using the Pythagorean Theorem and each answer is correct and properly simplified	The spiral is creatively colored and decorated. The end result is neat and interesting to look at.
2	Evidence of each compass constructions is shown but there are not 17 triangles	All work is shown using the Pythagorean Theorem but there may be 1 or 2 errors in calculation and/or some answers are not properly simplified	The spiral is completely colored but the results are not neat and it is clear that little effort was employed.
1	Partial or incorrect constructions shown	All work is shown but there are multiple conceptual, calculation, and/or simplification errors	The spiral is partially colored or incomplete.
0	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 Category Score:			
			*Total Points: _____

*To be added into Cumulative Review Category

Comments: