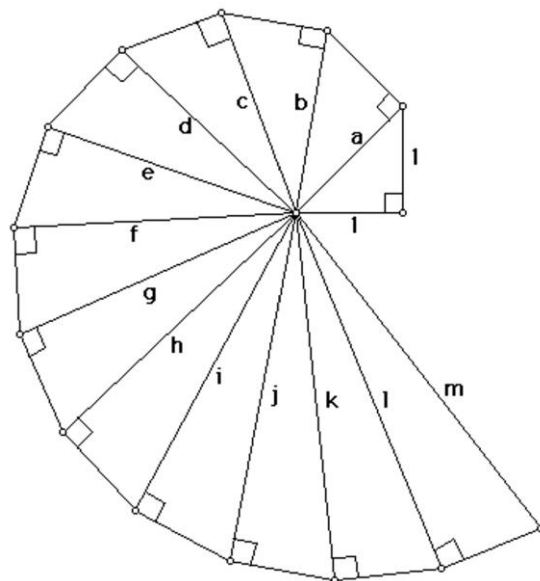


Create a Pythagorean spiral.

1. Start by drawing a right-angle triangle with a **base of 1 inch** and a **height of 1 inch**.
2. Use the Pythagorean theorem to calculate the exact length of the hypotenuse. Label the **hypotenuse 'a'** with your answer.
3. At the end of the hypotenuse 'a', draw a new line segment exactly 1 inch long and perpendicular to the hypotenuse.
4. Use hypotenuse 'a' and the new 1 inch side as the legs of your next right triangle. Use the Pythagorean theorem to **calculate the exact length of the new hypotenuse 'b'**.
5. Continue until you have constructed and labelled all of the triangles shown in the example.
For **each new triangle**:
 - a. draw a 1 inch side perpendicular to the previous hypotenuse,
 - b. calculate the exact length of the new hypotenuse,
 - c. label the hypotenuse with your answer.

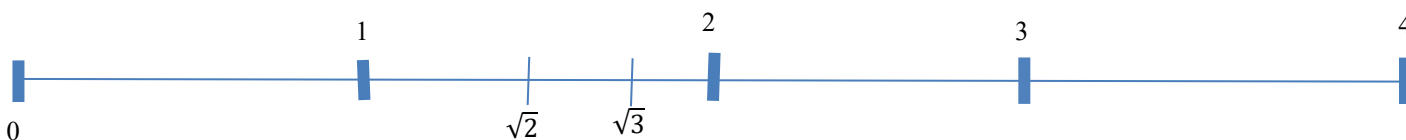


After you have completed the Pythagorean Spiral:

Use your completed Pythagorean spiral to locate each radical on a number line.

1. Draw a number line using 1 inch as one unit. Mark the whole numbers from 0 to 4.
2. Measure the length of the first hypotenuse, $\sqrt{2}$, on your spiral.
3. Transfer that length to the number line and mark its exact location. Label it $\sqrt{2}$.
4. Repeat this process using each hypotenuse from your spiral.
5. Continue until **every radical from your spiral** has been placed on the number line.
6. Check your work. Some radicals, such as $\sqrt{4}$ and $\sqrt{9}$, should land exactly on whole numbers.

Like this, but actual measurements.



The Pythagorean Theorem & Radicals

$$\sqrt{a^2 + b^2} = c$$

6. Draw a right angle triangle with a base of 2 cm and a height of 3 cm. Then, find the length of the hypotenuse in radical form.
7. Draw and label a right triangle whose hypotenuse is exactly $\sqrt{34}$ cm. Both legs must have whole-number lengths.
8. Draw and label a right triangle whose hypotenuse is exactly $\sqrt{58}$ cm.
9. Draw and label a right triangle whose hypotenuse is exactly $\sqrt{97}$ cm.
10. Draw and label a right triangle whose hypotenuse is exactly $\sqrt{153}$ cm.
11. There are **two different** right triangles with whole-number legs whose hypotenuse is $\sqrt{85}$ cm. Find both.
12. There are **two different** right triangles with whole-number legs whose hypotenuse is $\sqrt{130}$ cm. Find both.
13. Find **two different** right triangles with whole-number legs whose hypotenuse is $\sqrt{250}$ cm.
14. A student claims they can make a right triangle with whole-number legs and a hypotenuse of $\sqrt{30}$ cm. Determine whether this is possible. Explain your reasoning.
15. Draw a right angle triangle with a base of $\sqrt{2}$ cm and a height of 3 cm. Then, find the length of the hypotenuse in radical form.
16. Draw a right angle triangle with a base of 4 cm and a height of $\sqrt{13}$ cm. Then, find the length of the hypotenuse in radical form.
17. Draw a right angle triangle with a base of $\sqrt{7}$ cm and a height of $\sqrt{3}$ cm. Then, find the length of the hypotenuse in radical form.
18. Draw a right angle triangle with a base of $\sqrt{8}$ cm and a height of $\sqrt{5}$ cm. Then, find the length of the hypotenuse in radical form.
19. Draw a right angle triangle with a base of $\sqrt{10}$ cm and a height of $\sqrt{4}$ cm. Then, find the length of the hypotenuse in radical form.