Efofex Teacher Resource Project

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Spiral of Theodorus

Investigative Task

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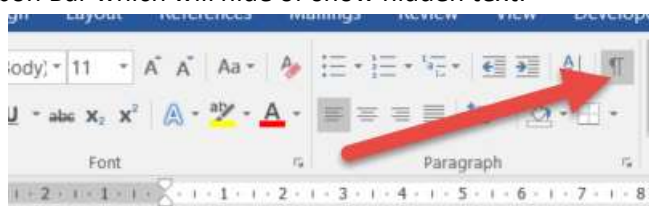
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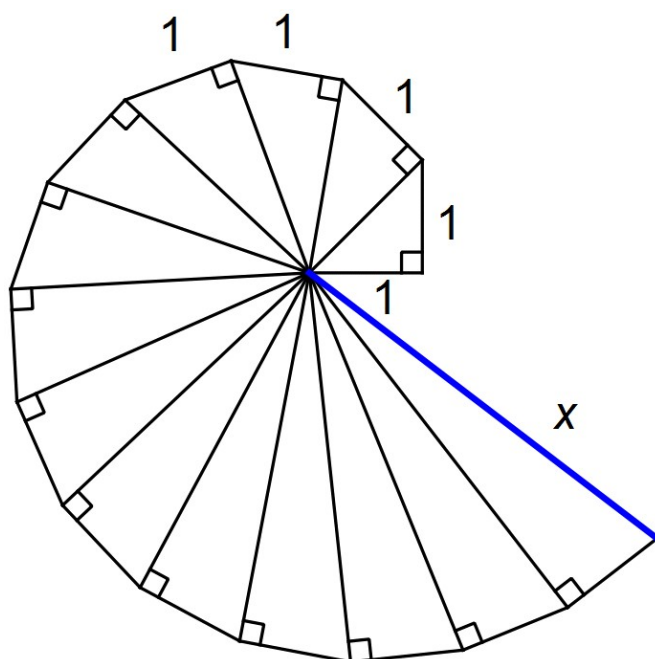
How Do I Use The Videos?

1. Copy the link into your web browser.
2. Left clicks have a quiet click sound.
3. Right clicks have a loud click sound.

Where Are The Solutions?

Solutions are only available in the Word docx format of the resources. Press this button on the Home Tab of the Ribbon Bar which will hide or show hidden text.
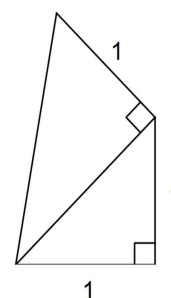
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Spiralling Triangles

We have constructed a spiral shape using a simple process. We start with a right isosceles triangle with short sides 1 unit long.
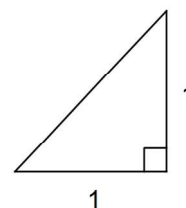
We then construct a new right triangle on the hypotenuse, keeping the outside edge 1 unit long.

We continue this process to construct the spiral shape at the top of the page.

1. **Calculate the exact length of x, the hypotenuse of the 14th triangle (the blue line on the original diagram).**

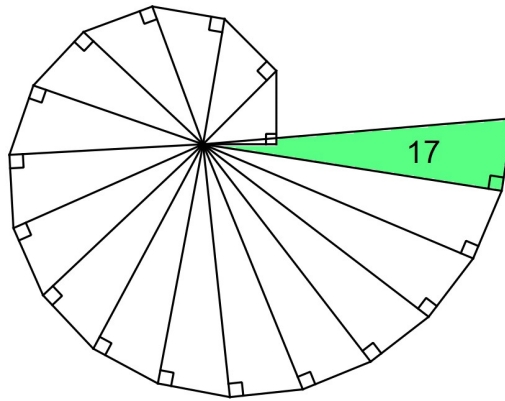   [2 Marks]

2. **Describe a pattern that you could use to determine the exact length of the hypotenuses of the triangles in the spiral.**

   [2 Marks]

3. **Calculate the length of the hypotenuse of the 104th triangle in the spiral.**

   [2 Marks]

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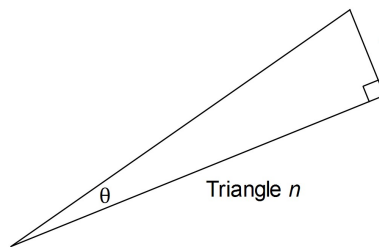
We have continued the pattern up to the 17th triangle and the triangles have begun to overlap. The spiral has completed **one rotation**. A student has hypothesized that, if the pattern was continued further, it would complete a second rotation after another 17 triangles – at triangle 34.

4. **Explain why the student is incorrect.**

[1 Mark]

5. **Devise a formula that calculates the central angle of a triangle (θ) given the triangle number (n).**

[2 Marks]

6. **Use your formula and a spreadsheet to complete this table. Provide full details of how you determined how many triangles were required to complete the rotations.**

Number of Rotations	Triangle Number
1	17
2	
3	
4	
5	

[6 Marks]

7. **Calculate the radius of the spiral after five rotations**

[1 Mark]