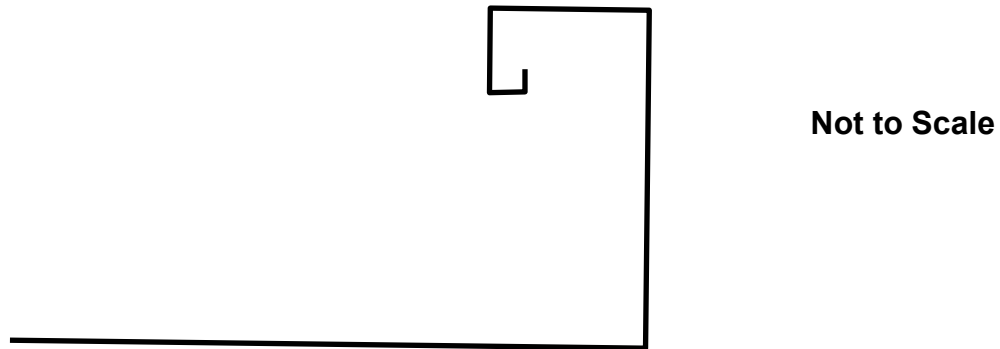


Triangles in a Spiral 1

1. Cut out the right-angled triangles on the Sheet A.

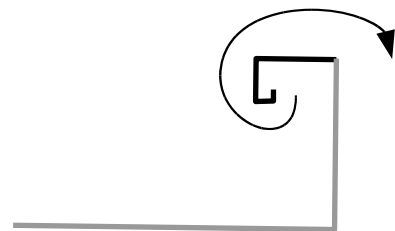
All of the triangles are the same shape or *similar*. Going from the smallest to the largest, each one is an enlargement of the previous one by the same scale factor.

Try to arrange the triangles so that the longest edges form a spiral like this:

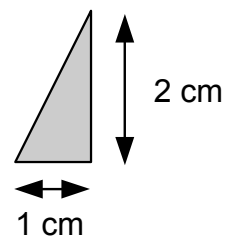


Some of the triangles will overlap.

Notice that 4 lines of the spiral make one full turn.



2. Here is right-angled triangle with a different shape.



Starting with this triangle, try to make another spiral like the one above. You can sketch it and label the measurements or draw the triangles accurately and cut them out.

What scale factor must you use?

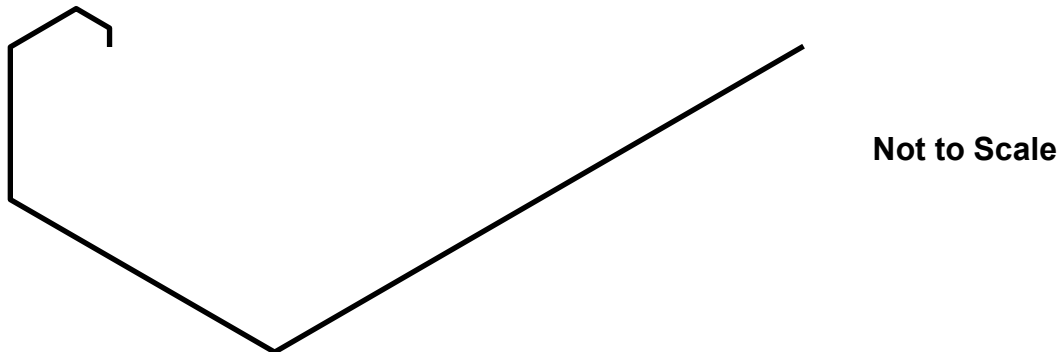
Explain why.

3. Draw a suitable starting triangle to use when the scale factor is 3. Label the lengths of the sides.

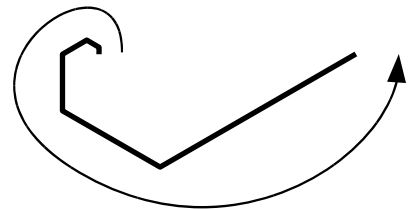
4. Cut out the right-angled triangles on the Sheet B.

Again, each one is an enlargement of the previous one by the same scale factor.

Try to fit the triangles together so that using one edge from each triangle, you make a spiral like this:



Notice that 6 lines of the spiral make one full turn.



5. Try to make another spiral like the one above.
This time, do not use right-angled triangles.

What angle **must** you have in your triangles?

Explain why.

6. Try to make a spiral from similar triangles that makes one full turn after exactly 5 lines have been drawn.

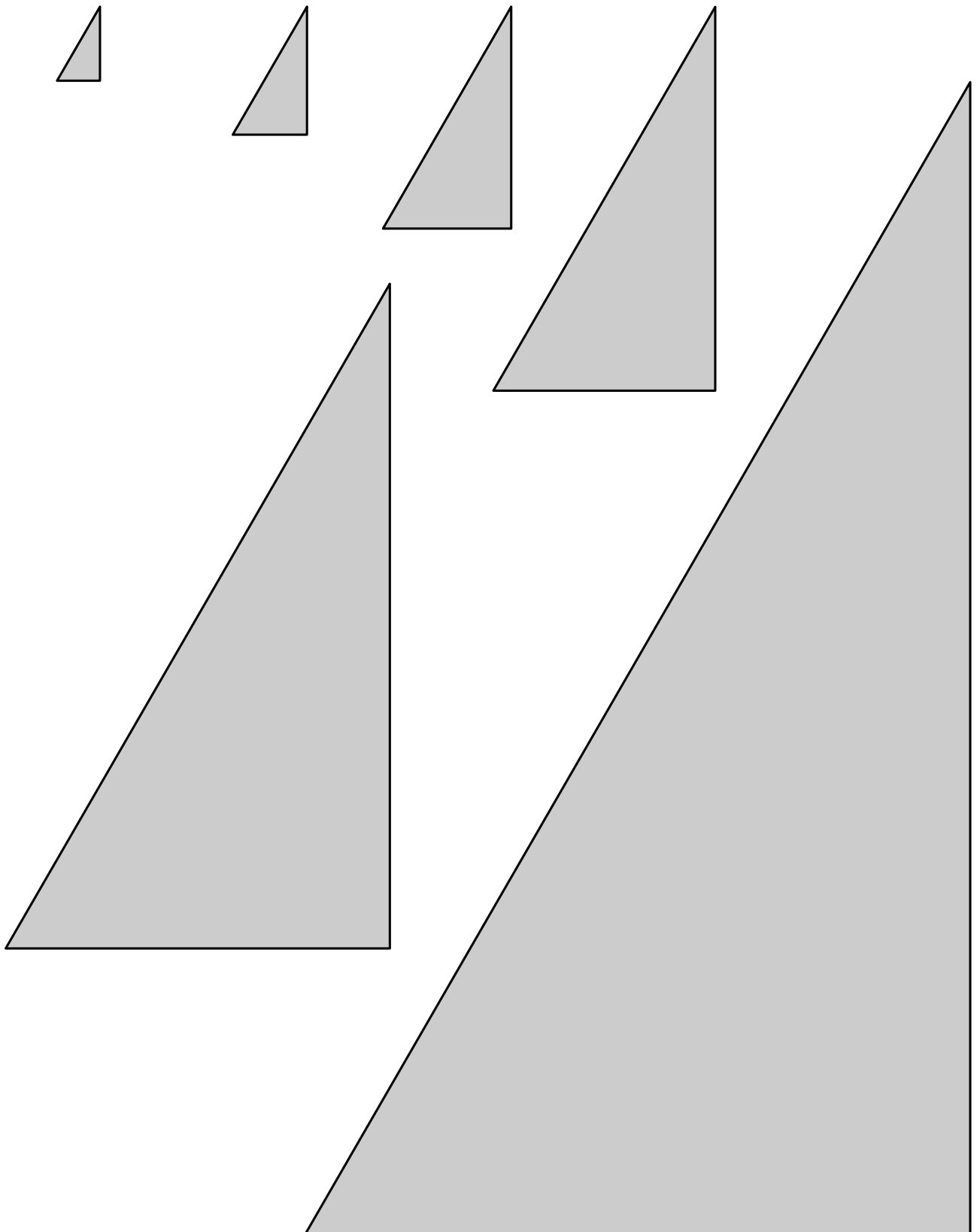
Try to make spirals so that one full turn is made after 3, 7 or 8 lines.

Write down what you find out about the angle you **must** have in the triangles in each case.

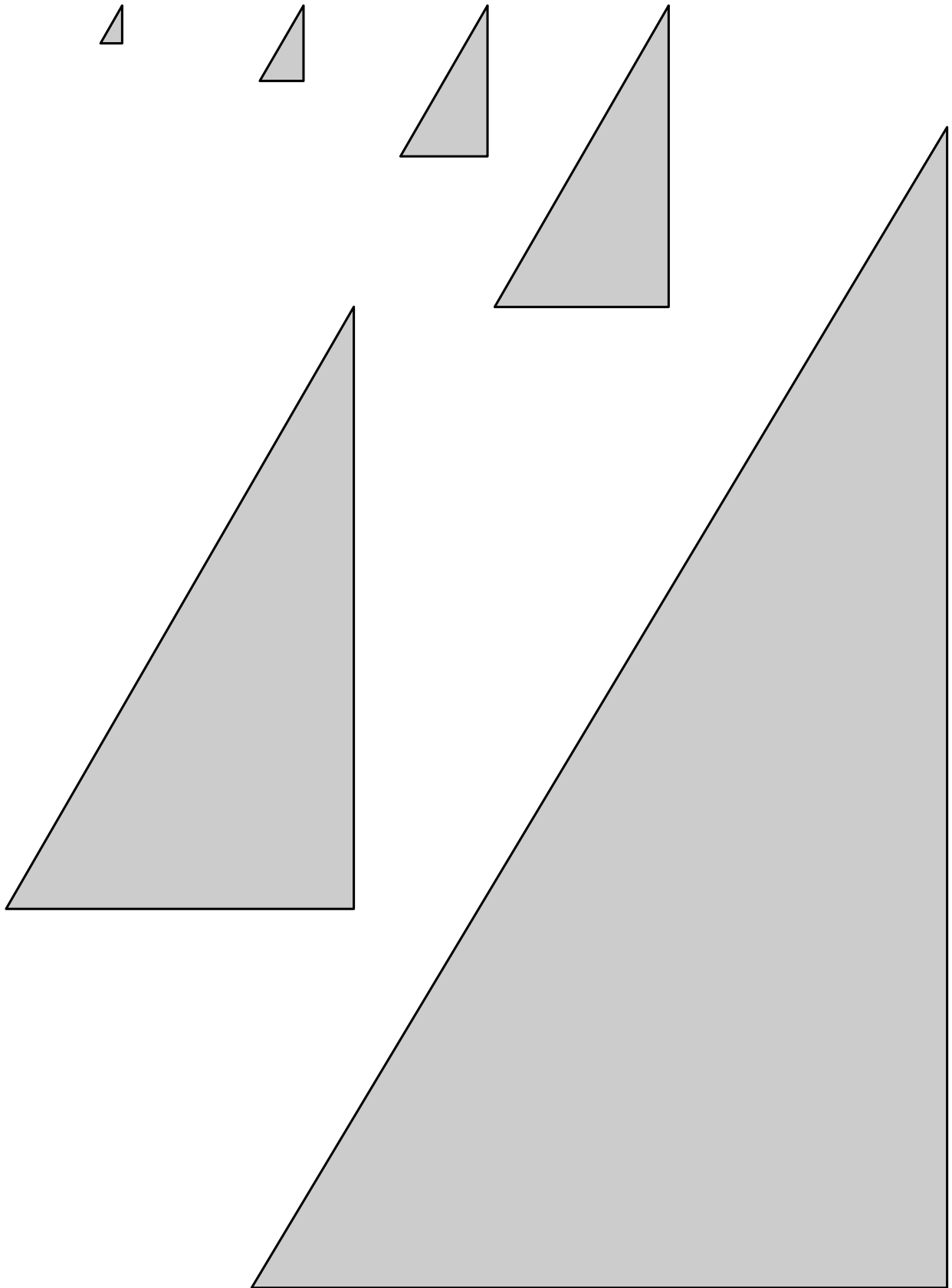
7. Extend your work in any way you choose.

You could look at the lengths of the spirals or the area of the triangles used in making them.

Triangles in a Spiral 1 – Sheet A



Triangles in a Spiral 1 – Sheet B



Triangles in a Spiral 2

Each of the spirals shown below is made from similar right-angled triangles.

The dimensions of the smallest triangles are shown.

Going from the smallest to the largest, each triangle is an enlargement of the previous one by the same scale factor.

- Find the length of the 1st, 2nd, 3rd ... and n th line segment in each spiral.
- Find the total length of each spiral when it has 2, 3, ... and n line segments.
- Find the area of the 1st, 2nd, 3rd ... and n th triangle used in making each spiral.
- Find the total shaded area for each spiral when it's made from 2, 3, ... and n triangles. *Remember that after the first few triangles, they start to overlap. A formula for n triangles will be for n greater than a certain number.*

Some of these tasks are **very** difficult!

As well as length and area you may have your own ideas for investigating these or other spirals made from similar triangles.

