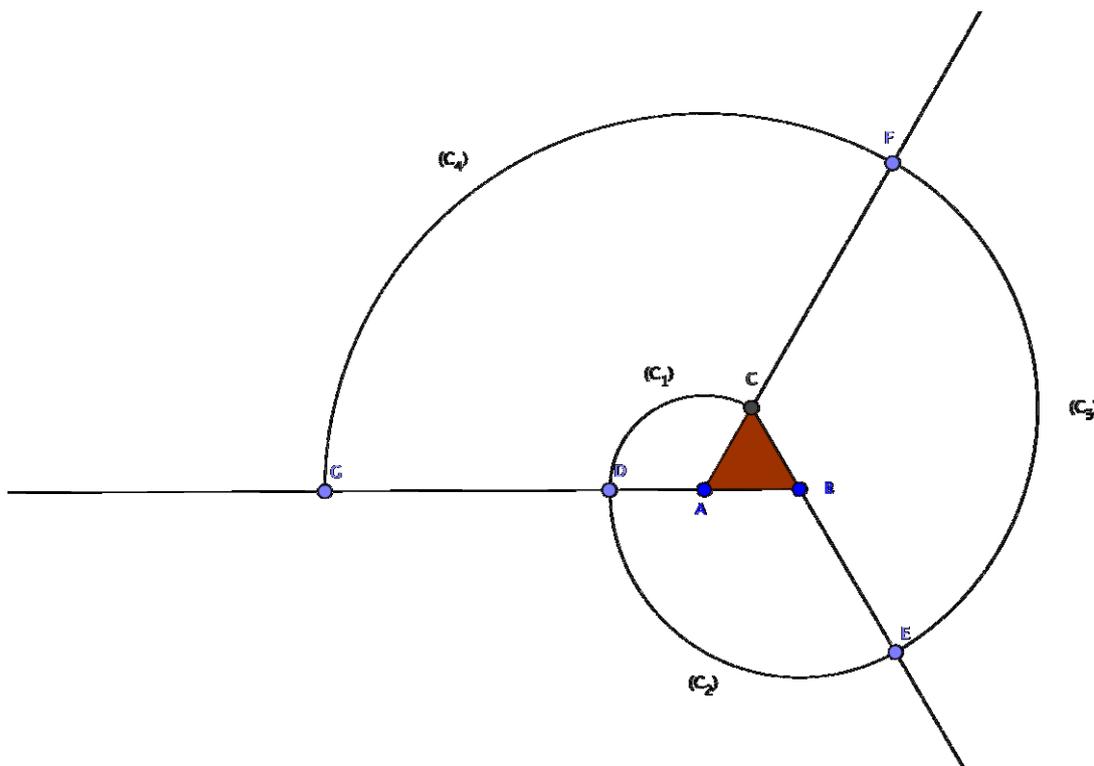


Subject n°30: Sequences

Please do not write on this document, and do not forget to hand it back at the end of the test.

The following spiral is built in the following way :



Starting from the equilateral triangle  $ABC$  so that  $AB=1$  cm, we draw an arc of circle centered in  $A$ , then an arc of circle centered in  $B$ , then an arc of circle centered in  $C$ , and finally an arc of circle centered in  $A$ .

Imagining that we continue this process, we trace a succession of arcs of circles  $(C_n)$  centered in  $A$ ,  $B$  or  $C$ .

We note the radius of the arc of circle  $(C_n)$  and  $l_n$  the length of this arc.

1°) Identify the sequence of the successive radii. (That is : first term and formula).

2°) Express  $l_n$  in terms of  $n$  and precise the nature (arithmetic or geometric) of the sequence  $(l_n)$ .

3°) What is the length of the spiral traced above ?

4°) What is the length of the spiral obtained by tracing ten arc of circles ?

Reminder : 
$$l_1 + l_2 + l_3 + \dots + l_n = \frac{l_1 + l_n}{2} \times n$$