Assignment 2.

Using OpenGL library for drawing planar curves.

1. In this example, the OpenGL begin/end paradigm (GL_LINE_STRIP) was used for drawing polygonal lines corresponding to:
   1. the graph of the function: $|\sin x| \cdot e^{-\sin x}, x \in [0, 8\pi]$ and
   2. the graph of the Conchoid of Nicomedes:

      $x = a \pm b\cos t, y = a\tan t \pm b\sin t, t \in (-\frac{\pi}{2}, \frac{\pi}{2})$.
2. As for assignment 1, add in the example program lines of code in order to draw the following graphs:
   1. The graph of the function $f(x) = \begin{cases} 1 & , \quad x = 0 \\ \frac{d(x)}{x} & , \quad 0 < x \leq 100 \end{cases}$,

      where $d(x)$ is the distance from x to the nearest integer.
   2. The following curves are given by parametric equations (for each example,
      the values of various parameters, called a, b, etc., can be found inside the
      images):
      1. The trisectrix of Longchamps:

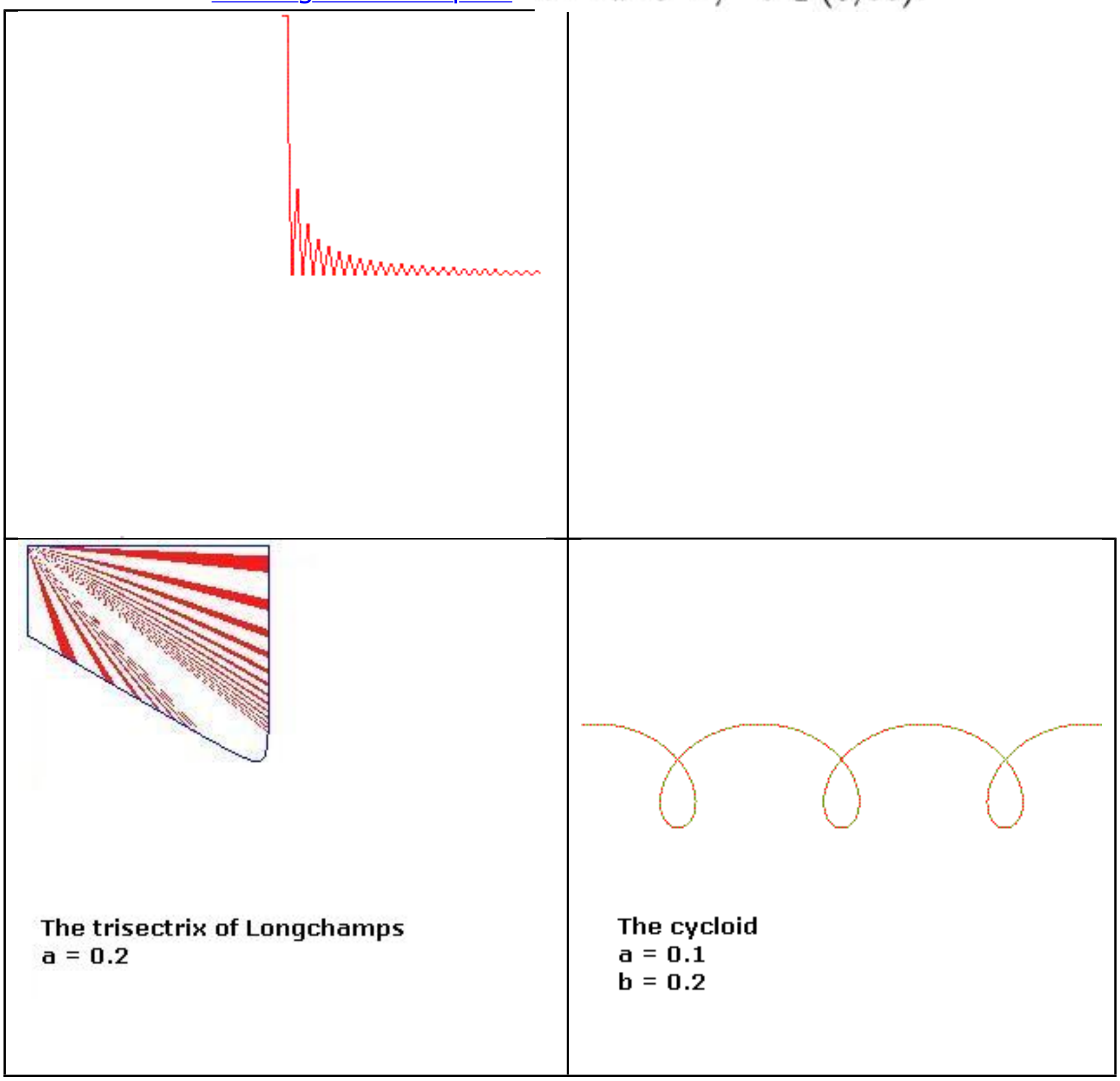
         $x = \frac{a}{4\cos^2 t - 3}, \quad y = \frac{a\tan t}{4\cos^2 t - 3}, \quad t \in (-\frac{\pi}{2}, \frac{\pi}{2}) \setminus \{\pm\frac{\pi}{6}\}$.
         Hint: First, draw the graph of the trisectrix of Longchamps (please note
         that the image is not the graph!). Use no scaling, use GL_POINTS
         and vary the ratio of arithmetic progression. Then overlap your
         window on the image requested and notice some patterns, the geometric
         objects etc. If your image has some/many pixels in the middle it is
         still considered correct.
      2. The cycloid:

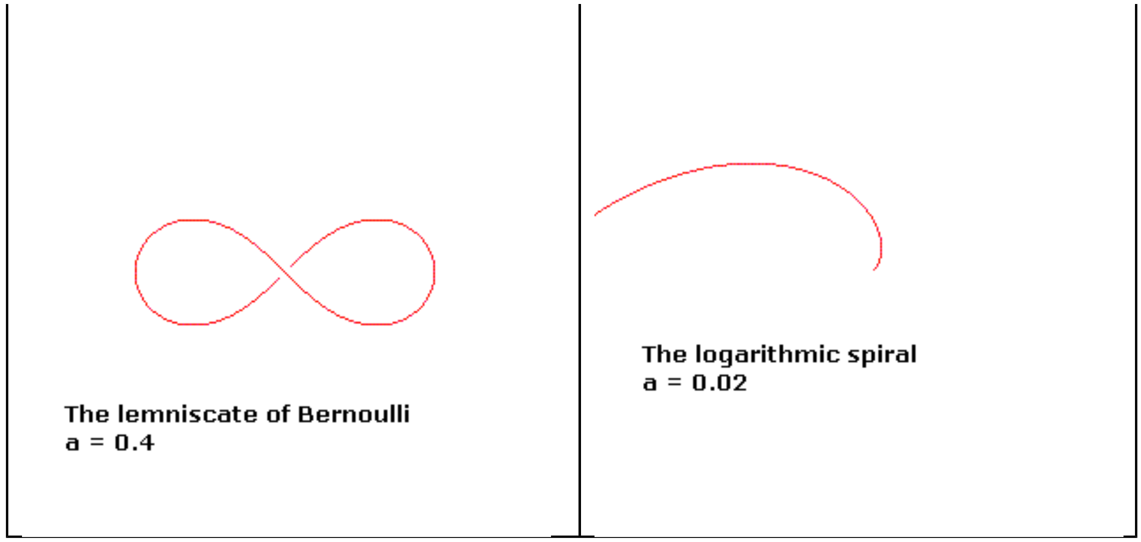
         $x = a \cdot t - b\sin t, \quad y = a - b\cos t, \quad t \in \mathbb{R}$.

3. Some curves are specified by polar equations: the polar coordinates are (r, t),

where $t \in [a, b]$ and $r = f(t)$. The polar coordinates (r, t) are transformed in
cartesian coordinates as following $x = r \cos t$ and $y = r \sin t$.
Add in the example program lines of code in order to draw the following
curves specified by polar equations:

1. The lemniscate of Bernoulli: $r = \pm a \cdot \sqrt{2 \cos 2t}, \quad t \in (-\frac{\pi}{4}, \frac{\pi}{4})$,
2. The logarithmic spiral: $r = a \cdot e^{1+t}, \quad t \in (0, \infty)$.




The lemniscate of Bernoulli
a = 0.4
The logarithmic spiral
a = 0.02