Math 421   Problem Set 3   Fall, 2006

Due: Wednesday, Oct. 4 (*postponed date*)

Below, `Cardano3` refers to David Park's two application packages.

1. (a) Sketch the curve $z(t) = t^2 + 2t + i(t+1)$ for $-2 \le t \le 2$ by taking the real and imaginary parts $x(t)$ and $y(t)$ and then eliminating the parameter t.

    (b) Now, *without* eliminating the parameter t, draw the same curve by using `ComplexCurve` from `Cardano3`.

2. Find a piecewise smooth parametrization of the positively-oriented, simple closed curve whose trace is the square with vertices $1, i, -1, -i$.

3. (a) Do page 46, Exercise 10.

    (b) Do page 46, Exercise 6. You may use the result of (a).

4. (a) Do page 61, Exercise 3 (c).

    (b) Do page 61, Exercise 4 (b).

5. Do page 63, Exercise 12 (b) with paper and pencil and then, to check your answer, by using Mathematica. Also use `Cardano3` to draw (a segment of) the given line and its image.

6. Do page 63, Exercise 15 (c) with paper and pencil and/or with Mathematica (that is, with paper and pencil alone, with Mathematica alone, or with both together). Also use `Cardano3` to draw the given triangle and its image.

7. Do page 69, Exercise 1 (d) with paper and pencil and/or with Mathematica. Also use `Cardano3` to draw the given triangle and its image.

8. Do page 69, Exercise 6 (a). Also use `Cardano3` to draw the given set and its image, too. If you use TwoPanelPlot, then use `PolarGrid`, of course.