Mathematics 1100Y – Calculus I: Calculus of one variable
TRENT UNIVERSITY, SUMMER 2011

Assignment #2
Plotting with `Maple`[†]
Due on Wednesday, 25 May, 2011.

Before attempting the questions below, please read the handout *A very quick start with* `Maple` and play around with `Maple` a little. It might also be useful to skim though *Getting started with* `Maple 10` by Gilberto E. Urroz – read those parts concerned with plotting curves more closely! – and perhaps keep it handy as a reference. You can find links to both documents on the MATH 1100Y web page. `Maple`'s help facility may also come in handy, especially when trying to make out the intricacies of what the `plot` command and its options and variations do.

1. Use `Maple` to plot the curves $y = 1 - x^2$, $-1 \leq x \leq 1$, and $x = 1 - y^2$, $-1 \leq y \leq 1$. [Please submit a printout of your worksheet(s).] *[2]*

2. Use `Maple` to plot the curve $x^2 + y^2 = 1$. Please submit a printout of your worksheet as your solution. *[1]*

One way to describe or define a curve in two dimensions is by way of *parametric equations*, $x = f(t)$ and $y = g(t)$, where the x and y coordinates of points on the curve are simultaneously specified by plugging a third variable, called the *parameter* (in this case t), into functions $f(t)$ and $g(t)$. This approach can come in handy for situations where it is impossible to describe all of a curve as the graph of a function of x (or of y) and arises pretty naturally in various physics problems. (Think of specifying, say, the position (x, y) of a moving particle at time t.) We will see more of parametric curves later on in Chapter 10 of the textbook.

3. Use `Maple` to plot the parametric curve $x = \cos(t)$, $y = \sin(t)$, where $0 \leq t \leq 2\pi$. [Please submit a printout of your worksheet.] *[1.5]*

4. The graph you obtained for **3** should look just like one of the graphs you obtained in **1** or **2**. Which one? Why are these graphs identical? *[1.5]*

5. Use `Maple` to plot the parametric curve $x = \sin(t)$, $y = \frac{1}{2} + \frac{1}{2}\cos(2t)$, where $0 \leq t \leq 2\pi$. [Please submit a printout of your worksheet.] *[1.5]*

6. The graph you obtained for **5** should look just like one of the graphs you obtained in **1** or **2**. Which one? Why are these graphs identical? *[2.5]*

REFERENCES

1. *A very quick start with* `Maple`, by Stefan Bilaniuk, which can found (pdf) at:
   `http://www.trentu.ca/mathematics/sb/1100Y/Summer-2011/MATH1100Y-maple-start.pdf`
2. *Getting started with Maple 10*, by Gilberto E. Urroz (2005), which can found (pdf) at: `http://www.trentu.ca/mathematics/sb/1100Y/Summer-2011/GettingStartedMaple10.pdf`

[†] ... though it may sometimes feel as if `Maple` is plotting *against* you.