MATH V1201 PROBLEM SET 5
DUE OCTOBER 20, 2009.

INSTRUCTOR: ROBERT LIPSHITZ

(1) In the textbook:

(Appendix H) 8, 27, 32, 36, 38, 47

(§17.1) 1, 2, 12, 17, 21, 23.

(2) (a) Let $y(t)$ denote your solution to 17.1.17. Define a parametric curve in $\mathbb{R}^2$ by $\vec{r}(t) = (y(t), y'(t))$. Plot the curve $\vec{r}(t)$.

(b) Repeat Part (2a) for your solution to 17.1.21.

(c) Repeat Part (2a) for your solution to 17.1.23.

(d) Say a few sentences about what these plots of $(y(t), y'(t))$ look like in the un-damped, under-damped, and over-damped cases.

(This is an example of plotting curves in *phase space*.)

(3) Use Newton's method to find approximate a solution to $z^4+3z^2+2z+1 = 0$ to 5 decimal places, starting with initial guess $1 + i$. (Note: these numbers are not cooked; use a calculator to do the arithmetic.) Feel free to check your answer however you like.

If you had trouble with	Do problems
H.8	H.1–H.14
H.27	H.25, H.26, H.28
H.32	H.29–H.31
H.36	H.33–H.35
H.38	H.37, H.39, H.40
H.47	Do the same for $\sin(2\theta)$ and $\sin(4\theta)$.
17.1.1, 2, 12	17.1.3, 4, 5, 13
17.1.17, 21, 23	17.1.18, 17.1.19, 22, 24

E-mail address: rl2327@columbia.edu