Math 153
Spring 2019

UPDATED GENERAL INFORMATION – MAY 20,2019

A reference to the file **http://math.ucr.edu/~res/math153-2019/cubic-example.pdf** should have been inserted near the beginning of Chapter 9 in the lecture notes. This file works out an example in which a cubic equation $x^3 + bx^2 + cx + d = 0$ is reduced to an equation with no second degree term ($x^3 + px + q = 0$) by a linear change of variables.

Comments on some other files

The file **http://math.ucr.edu/~res/math153-2019/delta-resistance-problem.pdf** solves a somewhat challenging algebraic question involving resistances in a DC electrical circuit.

Pages 317 – 320 of Burton give a brief account of the bitter feud between Tartaglia and Cardan about credit for the discovery of the cubic formula. A few other head-turning stories involving mathematicians are presented in the following file:

http://math.ucr.edu/~res/math153-2019/zzz-math-headlines.pdf

Finally, the three files

http://math.ucr.edu/~res/math153-2019/solstice-formula.pdf

http://math.ucr.edu/~res/math153-2019/solstice-derivation.pdf

http://math.ucr.edu/~res/math153-2019/solstice-table.pdf

contain information on a natural question about the length of the longest day as a function of latitude. The first file gives the formula for points lying between the Equator and the Arctic Circle, the second provides a derivation of this formula, and the third gives the values obtained from the formula for latitudes in the given range.

Note that the length of longest day function is continuous but not differentiable. For points whose latitude is less than that of the Arctic Circle, the derivative is easily obtainable from the soltice formula, while for point whose latitude is greater the derivative must be zero because the length of the longest day is 24 hours for points which lie on the boundary or inside the polar region.