Mathematics 1350H – Linear algebra I: Matrix algebra
TRENT UNIVERSITY, Summer 2013

Assignment #5
Due on Wednesday, 19 June, 2013.

Linear algebra for non-linear curves

Recall that the general equation of a circle of radius r centred at the point (p, q) is $(x-p)^2 + (y-q)^2 = r^2$, and that the general equation of a parabola with a vertical axis of symmetry is $y = ax^2 + bx + c$. Consider the points $(-2, 7)$, $(1, -2)$, and $(4, 0)$.

1. Find the equation(s) of (all) the circle(s) which pass through the three given points. *[3]*

2. Find the equation(s) of (all) the parabola(s) with a vertical axis of symmetry which pass through the three given points. *[3]*

3. In general, how many points would you usually need to have to completely determine an unique circle passing through them? Why? What are the exceptions? *[2]*

4. In general, how many points would you usually need to have to completely determine an unique parabola with a vertical axis of symmetry passing through them? Why? What are the exceptions? *[2]*