Math 54 Quiz 6
March 13th, 2014

1. In $\mathbb{P}_2$, find the change-of-coordinates matrix from the basis $\mathcal{B} = \{1 - 3t^2, 2 + t - 5t^2, 1 + 2t\}$ to the standard basis $\mathcal{E} = \{1, t, t^2\}$. Then write t^2 as a linear combination of the polynomials in $\mathcal{B}$.

2. Show that if A and B are similar, then $\det A = \det B$.

3. True or False. A is an $n \times n$ matrix.

   (a) If $A\mathbf{x} = \lambda\mathbf{x}$ for some vector $\mathbf{x}$, then λ is an eigenvalue of A.

   (b) A matrix A is not invertible if and only if 0 is an eigenvalue of A.

   (c) A number c is an eigenvalue of A if and only if the equation $(A - cI)\mathbf{x} = 0$ has a nontrivial solution.

   (d) To find the eigenvalues of A, reduce A to row echelon form.