Mathematics 1350H – Linear algebra I: Matrix algebra
Trent University, Summer 2014
Assignment #3
Quadratic nonsense
Due in class on Thursday, 5 June, 2014.

1. Find a 2×2 matrix $\mathbf{X} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ with real entries such that $\mathbf{X}^2 + 2\mathbf{X} = -5\mathbf{I}_2$. *[5]*

Note: $\mathbf{I}_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is the 2×2 identity matrix.

2. Is there a 2×2 matrix $\mathbf{X}$ with real entries such that $\mathbf{X}^2 + 2\mathbf{X} = -\mathbf{I}_2$, other than $\mathbf{X} = \mathbf{I}_2$? If so, find one; if not, explain why there isn't one. *[5]*