MTH 225
Quiz #3

1. Suppose A is an $n \times n$ real matrix with n distinct eigenvalues $\{\lambda_1, \ldots, \lambda_n\}$. Find all of the eigenvalues of the matrix $B = A + 4I$, where I is the identity matrix.

If $\vec{v}_i$ is an eigenvector of A with eigenvalue λ_i then

$$A\vec{v}_i = \lambda_i \vec{v}_i.$$

Therefore,

$$\begin{aligned}(A+4I)\vec{v}_i &= A\vec{v}_i + 4I\vec{v}_i \\ &= \lambda_i \vec{v}_i + 4\vec{v}_i \\ &= (\lambda_i + 4)\vec{v}_i\end{aligned}$$

Consequently the eigenvalues of $A+4I$ are $\lambda_i + 4$.