Homework 2: Matrices

1. Find $\mathbf{A}^2$, $\mathbf{A}^3$, $\mathbf{A}^4$, where:

$$\mathbf{A} = \begin{bmatrix} \cos\varphi & -\sin\varphi \\ \sin\varphi & \cos\varphi \end{bmatrix}$$

2. Find $f(\mathbf{A})$ for $f(x) = 2x^2 - 3x + 14$ and

$$\mathbf{A} = \begin{bmatrix} 1 & -2 & 2 \\ 3 & 0 & -2 \\ 2 & 0 & 1 \end{bmatrix}$$

3. Determine the matrix of cofactors for

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$$

4. Determine $\begin{vmatrix} 2 & 1 & 0 & 0 \\ 1 & 2 & 1 & 0 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 1 & 2 \end{vmatrix}$ by expanding.

5. Check that if

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$$

then $\mathbf{A}^{-1} = \frac{1}{9}\mathbf{A}$.
Hint: choose the simple way.

Please write the solutions clearly (by hand) on A4 paper and give it to me before 4/12/2018. Every solution will be given 1 point (correct, minor error possible), 0.5 pt. (good idea, but not all correct), 0 pt. (nothing worthy). The maximum for this homework is 5 pts.