

# Math 590 HW7

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**Problem 1.** Let  $A = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 10 \end{bmatrix}$ . Compute the determinant of A using the following method:

1. (a) Cofactor expansions.
2. (b) Row reduction.
3. (c) Using the “exterior” product  $(1\mathbf{e}_1 + 2\mathbf{e}_2 + 3\mathbf{e}_3)(4\mathbf{e}_1 + 5\mathbf{e}_2 + 6\mathbf{e}_3)(7\mathbf{e}_1 + 8\mathbf{e}_2 + 10\mathbf{e}_3)$ .
4. (d) By calculating directly the volume of the tetrahedron or parallelepiped formed by the column vectors of A.

**Problem 2.** Use Cramer’s rule to solve the system  $A\mathbf{x} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$  with the matrix A in Problem 1.