

Math 2270-004  
Homework due February 21.

Recall that problems which are not underlined are good for seeing if you can work with the underlying concepts; only the underlined problems need to be handed in. The Wednesday quiz will be drawn from all of these concepts and from these or related problems.

*3.1 Introduction to determinants*

1, 3, 9, 15, 25, 27, 29, 31, 39, 40, 41

*3.2: Properties of determinants*

1, 2, 3, 4, 5, 21, 25, 27, 29, 31, 33, 39

*3.3: Determinants and linear transformations; adjoint formula and Cramer's rule.*

3, 5, 13, 18, 21, 23, 27, 29, 31

**w6.1a)** Use Cramer's rule to re-solve for  $x$  and  $y$  in the linear system **w4.1c** from previous homework, namely

$$\begin{bmatrix} 5 & 2 \\ 7 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 5 \end{bmatrix}.$$

**w6.1b)** Compute the determinants of the two matrices in **w4.2** from previous homework, and verify that the determinant test correctly identifies the invertible matrix. The two matrices were

$$A := \begin{bmatrix} -1 & 1 & -4 \\ -1 & -1 & 2 \\ 4 & 1 & 1 \end{bmatrix} \quad B := \begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 3 \\ -2 & 1 & -2 \end{bmatrix}$$

**w6.1c)** Use the adjoint formula to re-find  $B^{-1}$  in **w6.1b**.

**w6.1d)** Use  $B^{-1}$  to solve the system

$$\begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 3 \\ -2 & 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}.$$

**w6.1e)** Re-solve for the  $y$ -variable in **w6.1d)**, using Cramer's Rule.