

Math 31CH Spring 2017 Homework 2, due
4/19/2017 in HW box in the basement of AP&M
by 5 pm

1 Reading

Read Sections 4.8, 4.9, 4.10, 5.1

2 Exercises to submit on Wednesday 4/19

2.1 Exercises from the text

Section 4.8: #1(Matrix A only), 2, 8, 11, 14, 18

Remark: For #14, we didn't cover the Cayley-Hamilton theorem in class, so please first read the statement in the text (Theorem 4.8.27). Also read Theorem 4.8.26 and freely use that statement in your proof of #14(c).

Section 4.9: #1, 3, 4.

2.2 Exercise not from the text

1. Let A be the 3-parallelogram in \mathbb{R}^3 which is spanned by the three vectors

$$\vec{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}, \vec{v}_3 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}.$$

Let $f : \mathbb{R}^3 \rightarrow \mathbb{R}$ be the function given by

$$f(x_1, x_2, x_3) = \begin{cases} x_1 x_2 x_3 & (x_1, x_2, x_3) \in A \\ 0 & (x_1, x_2, x_3) \notin A \end{cases}.$$

Find

$$\int_{\mathbb{R}^3} f(x, y, z) |d^3 \vec{x}|.$$