1. In class we discussed the more concrete interpretation of exterior algebra when constructed in terms of vectors, rather than covectors.

(a) List the standard basis for $\Lambda^3(\mathbb{R}^5)$

(b) Compute the exterior product of the following triples of vectors in $\mathbb{R}^5$:

i. $\begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}$, $\begin{pmatrix} 0 \\ 1 \\ -1 \\ 3 \\ 2 \end{pmatrix}$, $\begin{pmatrix} 1 \\ 0 \\ -1 \\ 1 \\ 2 \end{pmatrix}$

ii. $\begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}$, $\begin{pmatrix} 0 \\ 1 \\ 1 \\ 1 \\ 0 \end{pmatrix}$, $\begin{pmatrix} 0 \\ 0 \\ 1 \\ 1 \\ 1 \end{pmatrix}$

(c) Compute the Gram matrix of each of the triples of vectors in (b). What is the volume of the parallelopiped spanned by each? What are the areas of the faces?

(d) Compute the lengths of the wedge products from part (b). Compare with the parallelopiped volumes from (c).

2. Shifrin 8.3.2

3. Shifrin 8.4.9

4. Shifrin 8.4.10

5. Shifrin 8.4.11

6. Shifrin 8.6.3