

Worksheet 5

Due: Thursday, September 25

Remember, where appropriate, explain how you got your answers! No calculators are allowed or needed.

1. Compute $\det \begin{bmatrix} 1+i & 2-i \\ 3 & -i \end{bmatrix}$.
2. Compute $\langle (2+i, 1, 3i), (1-i, i, 1) \rangle$.
3. Compute $\|(3-2i, 2i)\|$.
4. Given that

$$\det \begin{bmatrix} -1 & -1 & 1 & -1 & 0 & 0 \\ 0 & 2 & -5 & -5 & -1 & -1 \\ 1 & 0 & 1 & 0 & 3 & 1 \\ -6 & 0 & 4 & -29 & -2 & 0 \\ -4 & 1 & -1 & -1 & 7 & 2 \\ -4 & 1 & -1 & 1 & -2 & 0 \end{bmatrix} = -862,$$

compute the determinants of the following matrices:

$$B = \begin{bmatrix} -1 & -1 & 1 & -1 & 0 & 0 \\ -6 & 0 & 4 & -29 & -2 & 0 \\ 1 & 0 & 1 & 0 & 3 & 1 \\ 0 & 2 & -5 & -5 & -1 & -1 \\ -4 & 1 & -1 & -1 & 7 & 2 \\ -4 & 1 & -1 & 1 & -2 & 0 \end{bmatrix}, \quad C = \begin{bmatrix} -1 & -1 & 1 & -1 & 0 & 0 \\ 0 & 2 & -5 & -5 & -1 & -1 \\ 1 & 0 & 1 & 0 & 3 & 1 \\ -6 & 0 & 4 & -29 & -2 & 0 \\ -4 & 1 & -1 & -1 & 7 & 2 \\ 0 & 0 & 0 & 2 & -9 & -2 \end{bmatrix},$$

and

$$D = \begin{bmatrix} -2 & -2 & 2 & -2 & 0 & 0 \\ 0 & 4 & -10 & -10 & -2 & -2 \\ 2 & 0 & 2 & 0 & 6 & 2 \\ -12 & 0 & 8 & -58 & -4 & 0 \\ -8 & 2 & -2 & -2 & 14 & 4 \\ -8 & 2 & -2 & 2 & -4 & 0 \end{bmatrix}.$$

5. Say the linear system

$$\begin{aligned} x &+ 19z - w = -3 \\ 2x + y + 3z - w &= 0 \\ -x - y + 3z + 3w &= 9 \\ x &- 7z + 5w = 21 \end{aligned}$$

has infinitely many solutions. What can you say about

$$\det \begin{bmatrix} 1 & 0 & 19 & -1 \\ 2 & 1 & 3 & -1 \\ -1 & -1 & 3 & 3 \\ 1 & 0 & -7 & 5 \end{bmatrix}?$$