

- Section 6.2: 6, 8, 10, 30, and 46.
- Section 6.3: 2, 4, 13, 14, and 24.

Problem 1. Consider the $n \times n$ matrix (with $n \geq 3$)

$$A_n = \begin{bmatrix} \lambda & 1 & 0 & 0 & \cdots & 0 \\ 1 & \lambda & 1 & 0 & & \vdots \\ 0 & 1 & \lambda & 1 & \ddots & \vdots \\ 0 & 0 & 1 & \lambda & \ddots & 0 \\ \vdots & & & \ddots & \ddots & \vdots \\ 0 & \cdots & \cdots & 0 & 1 & \lambda \end{bmatrix}$$

which has λ on the diagonal, 1 on the (immediate) sub/super-diagonal, and zeros everywhere else. Use Laplace expansion to show that

$$\det(A_n) = \lambda \det(A_{n-1}) - \det(A_{n-2})$$

Evaluate $\det(A_5)$.