• Section 7.5: 16 and 37(a)(b)(c).
• Chapter 7 Exercises (p. 382): 1–20.
• Find the eigenvalues and eigenvectors of
  \[ A = \begin{bmatrix} 0 & i \\ -i & 0 \end{bmatrix} \]
  where \( i = \sqrt{-1} \).
• Section 8.1: 8 and 10.
• Section 8.2: 6, 8, 22, and 28.
• Suppose we are sitting at \((0, 0, 0)\) on the landscape
  \[ z = 3x^2 + 6xy - 5y^2 \]
  where \( z \) represents altitude.
  (a) Which directions should we go to ascend/descend as quickly as possible?
  (b) What is the angle between these directions?
  (c) Find two linearly independent directions in which we stay at the same height.
• Consider the following matrix and quadratic form:
  \[ B = \begin{bmatrix} 4 & 3 \\ 0 & \sqrt{7} \end{bmatrix} \quad q(\vec{x}) = \|B\vec{x}\|^2 \]
  (a) Orthogonally diagonalize the quadratic form.
  (b) What are the minimal and maximal values of \( q(\vec{x}) \) among all vectors with \( \|\vec{x}\| = 1 \).
• Section 8.3: 6, 14, and 20.
• Chapter 8 exercises (p. 413): 1–16.