Matriculation number: 10001234
Student name: Jane Doe

1. (k points) How big is the parabolic segment between the parabola $f(x) = \frac{x^2}{2}$ and the line $g(x) = 4 + x$?

   Sketch a graph to visualize the desired area.

2. (k points) Given the function
$$f(x) = -2x^2 - 6x^3$$
   (a) Sketch f, f' and f'' in one coordinate system.
   (b) Identify all of the minimum and maximum points and find its inflection points.

3. Find all eigenvalues and eigenvectors of the matrix
$$A = \begin{bmatrix} 4 & -2 \\ -24 & 6 \end{bmatrix}.$$