

Matriculation number: 10009012

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

Sketch a graph to visualize the desired area.

2. (k points) Given the function

$$f(x) = 5x^2 - 6x^3$$

(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

$$A = \begin{bmatrix} 6 & -3 \\ -36 & 9 \end{bmatrix}.$$