

Exercise 1

Consider the function $f(x) = \frac{x^2 - 2}{(x + 2)(x + 1)}$. Let (C) its graph in an orthonormal system (O, \vec{i}, \vec{j}) .

1. Find the domain of definition D of the function f .
2. Calculate the limits of f at the bounds of its domain. What can we deduce?
3. Calculate $f'(x)$ for all $x \in D$.
4. Set up the table of variations of f and draw (C) .
5. Write $f(x)$ in the form $A + \frac{B}{x + 2} + \frac{C}{x + 1}$, where A , B and C are real numbers to be determined
6. Calculate the area bounded by (C) , the two lines $x = 2$, $x = 3$ and the x-axis.

Exercise 2

Calculate the following integrals :

1. $\int \frac{\sqrt{e^x} + 1}{2e^x} dx$.
2. $\int x^2 \ln(x) dx$.
3. $\int \sqrt{2x + 5} dx$.