Problem

Given the function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = x^2 - 3x + 1$ obtain the global minima of the function.

Knowledge (*What?*)

1. Differentiate $f(x)$ to get $\frac{df}{dx}$

2. Equate $\frac{df}{dx} = 0$

3. Use the second derivative test

Technique (*How?*)

By hand

$$\frac{df}{dx} = 2x - 3$$

$$2x - 3 = 0 \Rightarrow x = 3/2$$

$$\frac{d^2 f}{dx^2} = 2 > 0$$

By code

```
In [1]:
import sympy as sym

x = sym.Symbol("x")
sym.diff(x ** 2 - 3 * x + 1, x)
Out [1]:
2 * x − 3

In [2]:
sym.solveset(2 * x − 3, x)
Out [2]:
{3/2}

In [3]:
sym.diff(x ** 2 − 3 * x + 1, x, 2)
Out [3]:
2
```