Macroeconomics / Makroekonomie 318

Tutorial / Tutorial 2

April 1, 2022

You should try and solve these questions by hand. Once you have done so, you can check your answers in Julia as an optional coding exercise.

Alle vrae moet met die hand opgelos word. Nadat jy die antwoorde bereken het kan jy jou antwoorde in Julia nagaan as 'n opsionele programmeringsoefening.

Question / Vraag 1

You are provided with a table of values with data from the CPI and GDP indices. The first column provides the date, while the second column is is CPI and the third GDP.

Date	CPI	GDP
2021-q3	134.44	540332
2021-q4	138.43	530221
2022-q1	140.21	578890

a.) Calculate the growth rates for CPI and GDP for the provided table.

b.) Given the answers from a.) provide some insight into what is happening with inflation and GDP growth in this small sample.

Question 2

Provide the derivatives of the following functions,

1. $f(x) = 243$
2. $g(x) = 12x^4$
3. $h(x) = (10x^2 - x)^3$
4. $i(x) = \sqrt{(5x + 8)} + 14x^2$
5. $j(x) = \frac{(12x^4+5)}{(10x^2-x)} = (12x^4 + 5)(10x^2 - x)^{-1}$
6. $k(x) = e^{12x}$

Question 3

The following function is the total profit function for a firm that only produces one product. Determine if the function has a local maximum or minimum over the interval $[0, 10]$.

$$TP(x) = 200 + 30x - 8x^2 + 1/2x^3$$

Question 4

Determine the partial derivative of the following function with respect to both x and y.

$$m(x, y) = xy + 2x^2 - 4 + 15y^4 - \sqrt{(5y + 8)}$$