Test 2

October 1. 2025

Maths IB_2

`subjets` : *Maximum and Minimum* & Optimisation,

Tot :[/ 24 marks]

Name: _____

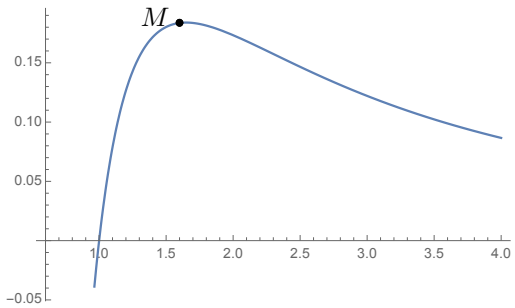
Problem 1

[/ 6 marks]

Let $g(x) = \frac{\ln(x)}{x^2}$

1. Use the quotient rule to show that $g'(x) = \frac{1 - 2\ln(x)}{x^3}$

2. The figure below shows the graph of g.

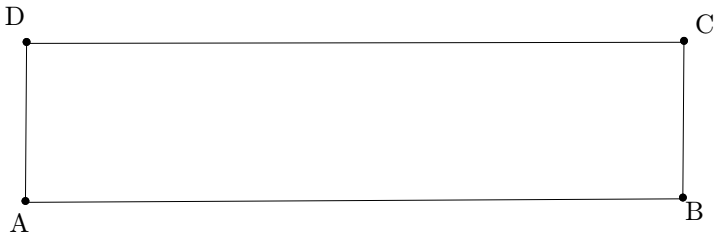


Find the coordinates of M.

Problem 2

[/ 9 marks]

A farmer wishes to create a rectangular enclosure, ABCD, of area 525 m^2, as shown below.



The fencing used for side AB costs 11€ per metre. The fencing for the other three sides costs 3€ per metre. The farmer creates an enclosure so that the cost is a minimum.
Find this minimum cost.

Problem 2 *[/ 9 marks]*

The position of a particle is given by $x(t) = \frac{e^t}{t}$

1) Using your calculator, give the *displacement* of the particle between $t_1 = 1s$ and $t_2 = 4s$

2) Find and expresssion for the *velocity* of the particle.

3) At what time is the particle *at rest* ?

4) Using your calculator, draw the graph of the *acceleration* of the parcicle

for t between 1 and 4 sec.

5) Looking at this graph, evaluate at what time the acceleration is equal to 7 ms^{-2}.