Part 1: without your calculator

EXERCISE 1 **NAME : .**

Determine

a. $\log_3(27) =$

b. $\log_4(0.5) =$

c. $\log_{25}(125) =$

d. $\log_x(1000000) = 3$, so $x =$

What is the question that you have to answer to determine the number "$\log_a(b)$" ?

EXERCISE 2 *2 pts*)

Graph a function $f : \mathbb{R} \to \mathbb{R}$ that is injective but not surjective. You don't need to give its expression.

Name :
Part 2 : without calculator

EXERCISE 3 (~ 5 pts)

We consider the function $f(x) = -2x^2 + 12x + 9$.

a. Determine its domain and range **so that it is a bijection.** Give the two solutions.

b. Give the expression of the inverse functions f_1^{-1} and f_2^{-1}, and give their domain.

EXERCISE 4 (~ 4 pts)

We consider the functions $f(x) = 3x^2 - x$ and $g(x) = -x + 5$.

a. Determine the simplified expressions of $(f \circ g)$, and of $(g \circ g \circ g \circ g \circ g)$.

b. Determine g^{-1} the inverse of g.

EXERCISE 5 (~ 7 pts)

a. Determine the number of digits and the 4 first digits of the number 99^{111}.

b. Determine the domain of the function $f(x) = \frac{\log(10-x^2)}{x+2}$

c. Rewrite $\log(\frac{10a^2}{b\sqrt{c}})$

EXERCISE 6 ~ 12 pts)

Solve the following equations :

a. $6^x = 666$

b. $2\log(x) = \log(25)$

c. $\log(1 - \log(2 + x)) = -1$

d. $4^x - 3.5 \cdot 2^x - 2 = 0$

EXERCISE 7 (~ 8 pts)

Here is the graph of the function f.

a. Why isn't it a bijection from $\mathbb{R}$ to $\mathbb{R}$?

b. Color the largest possible part(s) of the graph so that it becomes a bijection

c. Plot the graphs of $g(x) = f(x+1) + 2$ and of $h(x) = -|f(x)|$

d. Use the graph to determine $f(f(2))$

e. Use the graph to find 4 values of x such that $f(f(x)) = 0$. Make approximations if needed.