# 1 Introduction

$CrInGeCrInGeProduction.Supercringeintroductionhere:$

# 2 Some basic knowledge about researching problem...

Parameters and constants we use in this work:
**Constants** (3):
e = 2.718282
pi = 3.141593
AbObA = 1337.228690
**Variables** (2):
x = 1.000000
opa = 13.000000
**Parameters of exploration** :
*Number of differentiates* : 3
*Macloren's accuracy* : 3
*Tanget point* : 0.200000
*Delta coverage of tangent point*: 2.500000
*Graph diapasone* : $[-1:15]$
So let's calculate smth with a given function: f(x, opa) = $\ln(1.000 + x \cdot opa)$
Firstly, let's simplify this expression (if possible): f(x, opa) = $\ln(1.000 + x \cdot opa)$

# 3 Exploration of the expression as a function of multiple variables

**Calculation value of function in the point** BRITISH SCIENTISTS WERE SHOCKED, WHEN THEY COUNT IT!!!
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ **it's value** = 2.63906
Personally, I've always thought about first derivation of something like that function... Haven't you?
But now, by using informatics and math skills I feel that I'm prepared enough to calculate it!
`1 step:` Finding a derivation of $opa$
When I was child, my father always told me: "Remember, son:
$(opa)' =$
`2 step:` Finding a derivation of $x$
thanks to the results of my colleagues' scientific work, I know that:
$(x)' =$
`3 step:` Finding a derivation of $x \cdot opa$
What if:
$(x \cdot opa)' =$
`4 step:` Finding a derivation of 1.000
If someone asked me that in the middle of the night, I wouldn't hesitate to say:
$(1.000)' =$
`5 step:` Finding a derivation of $1.000 + x \cdot opa$
It's really easy to find:
$(1.000 + x \cdot opa)' =$
`6 step:` Finding a derivation of $\ln(1.000 + x \cdot opa)$
My friends always beat me, because I didn't know that:
$(\ln(1.000 + x \cdot opa))' =$
Congratulations! **The first derivation of the expression** is:
f'(x, opa) = $\frac{1.000}{1.000+x \cdot opa} \cdot (opa + x)$
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ it's value = 1.00000

**Finding the 3 derivation** Let's find **the 1 derivation** of the expression:
`1 step:` Finding a derivation of $opa$
Sounds logical that it is the same as:
$(opa)' =$
`2 step:` Finding a derivation of $x$
My roommate mumbled it in his sleep all night:
$(x)' =$
`3 step:` Finding a derivation of $x \cdot opa$
What if:
$(x \cdot opa)' =$
`4 step:` Finding a derivation of 1.000
While preparing for exams, I learned a lot of new things, for example:
$(1.000)' =$
`5 step:` Finding a derivation of $1.000 + x \cdot opa$
Sounds logical that it is the same as:
$(1.000 + x \cdot opa)' =$
`6 step:` Finding a derivation of $\ln(1.000 + x \cdot opa)$
I was asked not to tell anyone that:
$(\ln(1.000 + x \cdot opa))' =$
Let's find **the 2 derivation** of the expression:
`1 step:` Finding a derivation of $x$
Even my two-aged sister knows that:
$(x)' =$
`2 step:` Finding a derivation of $opa$
I was asked not to tell anyone that:
$(opa)' =$
`3 step:` Finding a derivation of $opa + x$
If someone asked me that in the middle of the night, I wouldn't hesitate to say:
$(opa + x)' =$
`4 step:` Finding a derivation of $opa$
thanks to the results of my colleagues' scientific work, I know that:
$(opa)' =$
`5 step:` Finding a derivation of $x$
My roommate mumbled it in his sleep all night:
$(x)' =$
`6 step:` Finding a derivation of $x \cdot opa$
Even my two-aged sister knows that:
$(x \cdot opa)' =$
`7 step:` Finding a derivation of 1.000
Man... Just look:
$(1.000)' =$
`8 step:` Finding a derivation of $1.000 + x \cdot opa$
For centuries, people have hunted for the secret knowledge that:
$(1.000 + x \cdot opa)' =$
`9 step:` Finding a derivation of 1.000
I was asked not to tell anyone that:
$(1.000)' =$
`10 step:` Finding a derivation of $\frac{1.000}{1.000+x \cdot opa}$
For centuries, people have hunted for the secret knowledge that:
$(\frac{1.000}{1.000+x \cdot opa})' =$
`11 step:` Finding a derivation of $\frac{1.000}{1.000+x \cdot opa} \cdot (opa + x)$
When I was child, my father always told me: "Remember, son:
$(\frac{1.000}{1.000+x \cdot opa} \cdot (opa + x))' =$
Let's find **the 3 derivation** of the expression:
`1 step:` Finding a derivation of $opa$
While preparing for exams, I learned a lot of new things, for example:
$(opa)' =$
`2 step:` Finding a derivation of $x$
thanks to the results of my colleagues' scientific work, I know that:
$(x)' =$
`3 step:` Finding a derivation of $x \cdot opa$
Sounds logical that it is the same as:
$(x \cdot opa)' =$
`4 step:` Finding a derivation of 1.000
A true prince must know that:
$(1.000)' =$
`5 step:` Finding a derivation of $1.000 + x \cdot opa$
If someone asked me that in the middle of the night, I wouldn't hesitate to say:
$(1.000 + x \cdot opa)' =$
`6 step:` Finding a derivation of 1.000
If someone asked me that in the middle of the night, I wouldn't hesitate to say:
$(1.000)' =$
`7 step:` Finding a derivation of $\frac{1.000}{1.000+x \cdot opa}$
My friends always beat me, because I didn't know that:
$(\frac{1.000}{1.000+x \cdot opa})' =$
`8 step:` Finding a derivation of 2.000
What if:
$(2.000)' =$
`9 step:` Finding a derivation of $2.000 \cdot \frac{1.000}{1.000+x \cdot opa}$
Sounds logical that it is the same as:
$(2.000 \cdot \frac{1.000}{1.000+x \cdot opa})' =$
`10 step:` Finding a derivation of $x$

thanks to the results of my colleagues' scientific work, I know that:
$(x)' =$
`11 step:` Finding a derivation of $opa$
Even my two-aged sister knows that:
$(opa)' =$
`12 step:` Finding a derivation of $opa + x$
While preparing for exams, I learned a lot of new things, for example:
$(opa + x)' =$
`13 step:` Finding a derivation of $opa$
When I was child, my father always told me: "Remember, son:
$(opa)' =$
`14 step:` Finding a derivation of $x$
It's really easy to find:
$(x)' =$
`15 step:` Finding a derivation of $x \cdot opa$
For centuries, people have hunted for the secret knowledge that:
$(x \cdot opa)' =$
`16 step:` Finding a derivation of 1.000
If someone asked me that in the middle of the night, I wouldn't hesitate to say:
$(1.000)' =$
`17 step:` Finding a derivation of $1.000 + x \cdot opa$
Sounds logical that it is the same as:
$(1.000 + x \cdot opa)' =$
`18 step:` Finding a derivation of $(1.000 + x \cdot opa)^{2.000}$
I spend the hole of my life to find the answer and finally it's:
$((1.000 + x \cdot opa)^{2.000})' =$
`19 step:` Finding a derivation of $x$
While preparing for exams, I learned a lot of new things, for example:
$(x)' =$
`20 step:` Finding a derivation of $opa$
I spend the hole of my life to find the answer and finally it's:
$(opa)' =$
`21 step:` Finding a derivation of $opa + x$
When I was child, my father always told me: "Remember, son:
$(opa + x)' =$
`22 step:` Finding a derivation of $-1.000$
For centuries, people have hunted for the secret knowledge that:
$(-1.000)' =$
`23 step:` Finding a derivation of $(-1.000) \cdot (opa + x)$
What if:
$((-1.000) \cdot (opa + x))' =$
`24 step:` Finding a derivation of $\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}}$
A true prince must know that:
$(\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}})' =$
`25 step:` Finding a derivation of $\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}} \cdot (opa + x)$
Man... Just look:
$(\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}} \cdot (opa + x))' =$
`26 step:` Finding a derivation of $\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}} \cdot (opa + x) + 2.000 \cdot \frac{1.000}{1.000+x\cdot opa}$
I was asked not to tell anyone that:
$(\frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}} \cdot (opa + x) + 2.000 \cdot \frac{1.000}{1.000+x\cdot opa})' =$
**Finally... The 3 derivation of the expression:**
$f^{(3)}(\mathrm{x, opa}) = \frac{(-2.000)\cdot(1.000+x\cdot opa)^{2.000} - 2.000\cdot(1.000+x\cdot opa)\cdot(opa+x)\cdot(-1.000)\cdot(opa+x)}{((1.000+x\cdot opa)^{2.000})^{2.000}} \cdot (opa + x) + 2.000 \cdot \frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}} + 2.000 \cdot \frac{(-1.000)\cdot(opa+x)}{(1.000+x\cdot opa)^{2.000}}$
BRITISH SCIENTISTS WERE SHOCKED AGAIN, WHEN THEY COUNT THE 3 DERIVATION OF THIS EXPRESSION!!!
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ it's value = 1.57143

**Finding partical derivations** Partial derivation of the expression on the variable x:
$\frac{\partial f}{\partial x} = 13.000 \cdot \frac{1.000}{1.000+13.000\cdot x}$
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ it's value = 0.92857 !!!
Partial derivation of the expression on the variable opa:
$\frac{\partial f}{\partial opa} = \frac{1.000}{1.000+opa}$
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ it's value = 0.07143 !!!

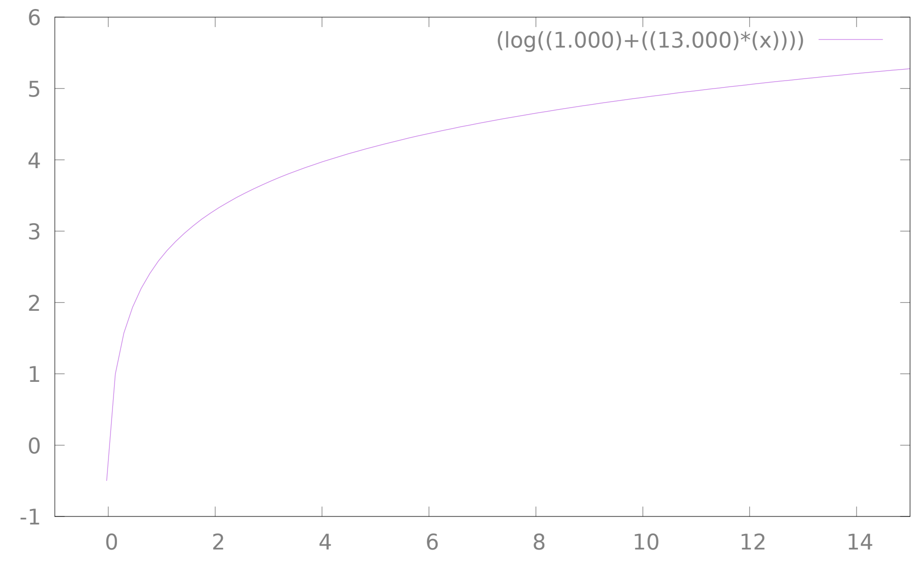
**Finding full derivation** Full derivation:
$\sqrt{(13.000 \cdot \frac{1.000}{1.000+13.000\cdot x})^{2.000} + (\frac{1.000}{1.000+opa})^{2.000}}$
In the point $M_0(x_0, opa_0) = (1.000, 13.000)$ it's value = 0.93131 !!!

# 4 Exploration the expression as a function of the first variable

Now let's consider the expression as a function of x variable: $\mathrm{f(x)} = \ln(1.000 + 13.000 \cdot x)$

**Decomposing on Macloren's formula** **Maklorens formula for** $x \to x_0 = 1.000$:
$\mathrm{f(x)} = 2.639 + 0.929 \cdot (x - 1.000) + (-0.431) \cdot (x - 1.000)^{2.000} + 0.267 \cdot (x - 1.000)^{3.000} + \mathrm{o}((x - 1.000)^{3.000})$

**Graphics** **Graph** $\mathrm{f(x)} = \ln(1.000 + 13.000 \cdot x)$ on the diapasone $x \in [-1 : 15]$ :




**Equations in the point** **Tangent equation** in the point $x_0 = 0.200$:
$\mathrm{f(x)} = 3.611 \cdot (x - 0.200) + 1.281$
**Normal equation** in the point $x_0 = 0.200$:
$\mathrm{f(x)} = (-0.277) \cdot (x - 0.200) + 1.281$
Their graphs in $\delta = 2.50000$ coverage of the point $x_0 = 0.200000$