

1 Introduction

CrInGeCrInGeProduction.Supercringeintroductionhere :

2 Some basic knowledge about researching problem...

Let’s calculate smth with a given function: $f(x) = \ln(1.000 + x)$
Firstly, let’s simplify this expression (if possible): $f(x) = \ln(1.000 + x)$

3 Exploration of the expression

Calculation value of function in the point BRITISH SCIENTISTS WERE SHOCKED, WHEN THEY COUNT IT!!!

In the point $M_0(x_0) = (1.000)$ **it’s value** = 0.69315
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 x
While preparing for exams, I learned a lot of new things, for example:
 $(x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
2 step: Finding a derivation of 1.000
It’s really easy to find:
 $(1.000)' = \dots = [\text{top secret}] = \dots =$
= 0.000
3 step: Finding a derivation of $1.000 + x$
My roommate mumbled it in his sleep all night:
 $(1.000 + x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
4 step: Finding a derivation of $\ln(1.000 + x)$
Sounds logical that it is the same as:
 $(\ln(1.000 + x))' = \dots = [\text{top secret}] = \dots =$
= $\frac{1.000}{1.000+x}$
Congratulations! **The first derivation of the expression** is:
 $f'(x) = \frac{1.000}{1.000+x}$
In the point $M_0(x_0) = (1.000)$ it’s value = 0.50000

Finding the 3 derivation Let’s find **the 1 derivation** of the expression:

1 step: Finding a derivation of x
For centuries, people have hunted for the secret knowledge that:
 $(x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
2 step: Finding a derivation of 1.000
Sounds logical that it is the same as:
 $(1.000)' = \dots = [\text{top secret}] = \dots =$
= 0.000
3 step: Finding a derivation of $1.000 + x$
It’s really easy to find:
 $(1.000 + x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
4 step: Finding a derivation of $\ln(1.000 + x)$
My roommate mumbled it in his sleep all night:
 $(\ln(1.000 + x))' = \dots = [\text{top secret}] = \dots =$
= $\frac{1.000}{1.000+x}$
Let’s find **the 2 derivation** of the expression:
1 step: Finding a derivation of x
What if:
 $(x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
2 step: Finding a derivation of 1.000
It’s really easy to find:
 $(1.000)' = \dots = [\text{top secret}] = \dots =$
= 0.000
3 step: Finding a derivation of $1.000 + x$
Even my two-aged sister knows that:
 $(1.000 + x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
4 step: Finding a derivation of 1.000
When I was child, my father always told me: ”Remember, son:
 $(1.000)' = \dots = [\text{top secret}] = \dots =$
= 0.000
5 step: Finding a derivation of $\frac{1.000}{1.000+x}$
I spend the hole of my life to find the answer and finally it’s:
 $(\frac{1.000}{1.000+x})' = \dots = [\text{top secret}] = \dots =$
= $\frac{(-1.000) \cdot 1.000}{(1.000+x)^{2.000}}$
Let’s find **the 3 derivation** of the expression:
1 step: Finding a derivation of x
Man... Just look:
 $(x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
2 step: Finding a derivation of 1.000
For centuries, people have hunted for the secret knowledge that:
 $(1.000)' = \dots = [\text{top secret}] = \dots =$
= 0.000
3 step: Finding a derivation of $1.000 + x$
It’s really easy to find:
 $(1.000 + x)' = \dots = [\text{top secret}] = \dots =$
= 1.000
4 step: Finding a derivation of $(1.000 + x)^{2.000}$
It’s simple as fuck:
 $((1.000 + x)^{2.000})' = \dots = [\text{top secret}] = \dots =$
= $2.000 \cdot (1.000 + x)$
5 step: Finding a derivation of -1.000
thanks to the results of my colleagues’ scientific work, I know that:

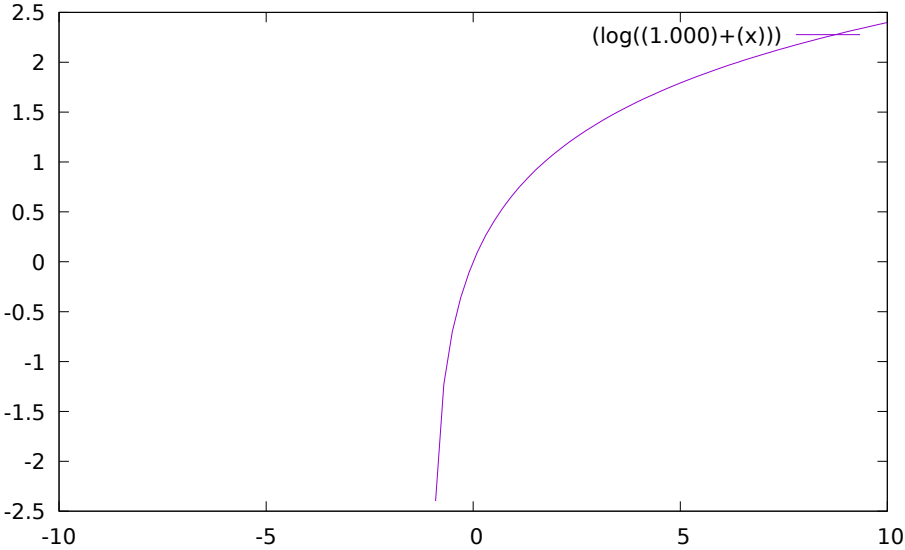
$(-1.000)' = \dots = [\text{top secret}] = \dots =$
 $= 0.000$
6 step: Finding a derivation of $\frac{(-1.000)}{(1.000+x)^{2.000}}$
When I was child, my father always told me: "Remember, son:
 $(\frac{(-1.000)}{(1.000+x)^{2.000}})' = \dots = [\text{top secret}] = \dots =$
 $= \frac{(-1.000) \cdot (-1.000) \cdot 2.000 \cdot (1.000+x)}{((1.000+x)^{2.000})^2.000}$
Finally... The 3 derivation of the expression:
 $f^{(3)}(x) = \frac{(-1.000) \cdot (-1.000) \cdot 2.000 \cdot (1.000+x)}{((1.000+x)^{2.000})^2.000}$
BRITISH SCIENTISTS WERE SHOCKED AGAIN, WHEN THEY COUNT THE 3 DERIVATION OF THIS EXPRESSION!!!
In the point $M_0(x_0) = (1.000)$ it's value = 0.25000

Finding partial derivations Partial derivation of the expression on the variable x:
 $\frac{\partial f}{\partial x} = \frac{1.000}{1.000+x}$
In the point $M_0(x_0) = (1.000)$ it's value = 0.50000 !!!

Finding full derivation Full derivation:
 $\sqrt[2.000]{(\frac{1.000}{1.000+x})^{2.000}}$
In the point $M_0(x_0) = (1.000)$ it's value = 0.50000 !!!

Decomposing on Macloren's formula Maklorems formula for $x \rightarrow x_0 = 1.000$:
 $f(x) = 0.693 + 0.500 \cdot (x - 1.000) + (-0.125) \cdot (x - 1.000)^{2.000} + 0.042 \cdot (x - 1.000)^{3.000} + (-0.016) \cdot (x - 1.000)^{4.000} + 0.006 \cdot (x - 1.000)^{5.000} + (-0.003) \cdot (x - 1.000)^{6.000} + \dots$

Graphics Graph $f(x) = \ln(1.000 + x)$ on the diapasone $x \in [-10 : 10]$:



Equations in the point Tangent equation in the point $x_0 = 1.000$:
 $f(x) = 0.500 \cdot (x - 1.000) + 0.693$
Normal equation in the point $x_0 = 1.000$:
 $f(x) = (-2.000) \cdot (x - 1.000) + 0.693$

