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:

$(x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`2 step:` Finding a derivation of 1.000

It's really easy to find:

$(1.000)' = ... =$ [top secret] $= ... =$

$= 0.000$

`3 step:` Finding a derivation of $1.000 + x$

My roommate mumbled it in his sleep all night:

$(1.000 + x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`4 step:` Finding a derivation of $\ln(1.000 + x)$

Sounds logical that it is the same as:

$(\ln(1.000 + x))' = ... =$ [top secret] $= ... =$

$= \frac{1.000}{1.000+x}$

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:

$(x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`2 step:` Finding a derivation of 1.000

Sounds logical that it is the same as:

$(1.000)' = ... =$ [top secret] $= ... =$

$= 0.000$

`3 step:` Finding a derivation of $1.000 + x$

It's really easy to find:

$(1.000 + x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`4 step:` Finding a derivation of $\ln(1.000 + x)$

My roommate mumbled it in his sleep all night:

$(\ln(1.000 + x))' = ... =$ [top secret] $= ... =$

$= \frac{1.000}{1.000+x}$

Let's find **the 2 derivation** of the expression:

`1 step:` Finding a derivation of x

What if:

$(x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`2 step:` Finding a derivation of 1.000

It's really easy to find:

$(1.000)' = ... =$ [top secret] $= ... =$

$= 0.000$

`3 step:` Finding a derivation of $1.000 + x$

Even my two-aged sister knows that:

$(1.000 + x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`4 step:` Finding a derivation of 1.000

When I was child, my father always told me: "Remember, son:

$(1.000)' = ... =$ [top secret] $= ... =$

$= 0.000$

`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:

$(\frac{1.000}{1.000+x})' = ... =$ [top secret] $= ... =$

$= \frac{(-1.000)\cdot 1.000}{(1.000+x)^{2.000}}$

Let's find **the 3 derivation** of the expression:

`1 step:` Finding a derivation of x

Man... Just look:

$(x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`2 step:` Finding a derivation of 1.000

For centuries, people have hunted for the secret knowledge that:

$(1.000)' = ... =$ [top secret] $= ... =$

$= 0.000$

`3 step:` Finding a derivation of $1.000 + x$

It's really easy to find:

$(1.000 + x)' = ... =$ [top secret] $= ... =$

$= 1.000$

`4 step:` Finding a derivation of $(1.000 + x)^{2.000}$

It's simple as fuck:

$((1.000 + x)^{2.000})' = ... =$ [top secret] $= ... =$

$= 2.000 \cdot (1.000 + x)$

`5 step:` Finding a derivation of -1.000

thanks to the results of my colleagues' scientific work, I know that:

$(-1.000)' = ... = [\text{top secret}] = ... =$
$= 0.000$

`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:
$(\frac{(-1.000)}{(1.000+x)^{2.000}})' = ... = [\text{top secret}] = ... =$
$= \frac{(-1.000)\cdot(-1.000)\cdot 2.000\cdot(1.000+x)}{((1.000+x)^{2.000})^{2.000}}$

Finally... The 3 derivation of the expression:

$f^{(3)}(\text{x}) = \frac{(-1.000)\cdot(-1.000)\cdot 2.000\cdot(1.000+x)}{((1.000+x)^{2.000})^{2.000}}$

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 partical 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:

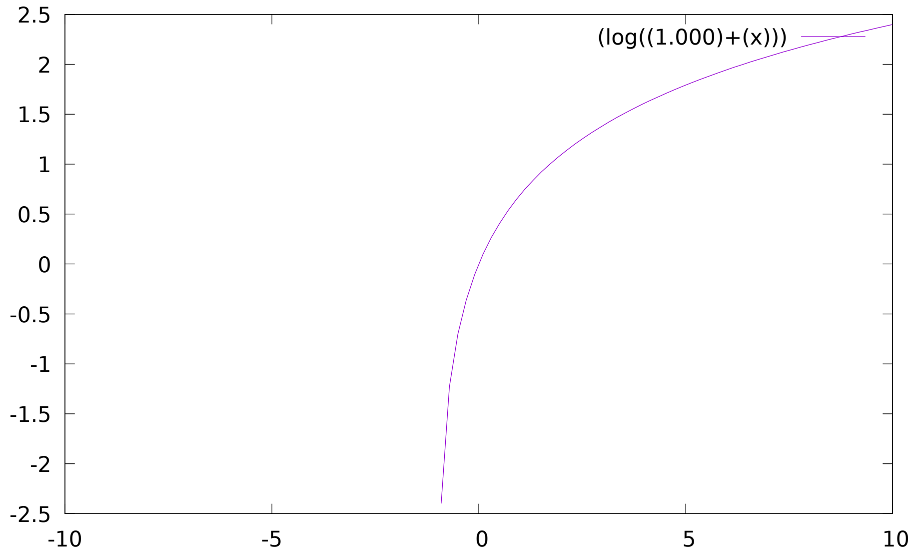
$\sqrt{(\frac{1.000}{1.000+x})^{2.000}}$

In the point $M_0(x_0) = (1.000)$ it's value = 0.50000 !!!

Decomposing on Macloren's formula **Maklorens formula for** $x \to x_0 = 1.000$:

$\text{f(x)} = 0.693 + 0.500 \cdot (x - 1.000) + (-0.125) \cdot (x - 1.000)^{2.000} + 0.042 \cdot (x - 1.000)^{3.000} + (-0.016) \cdot (x - 1.000)^{4.000} + 0.006 \cdot (x - 1.000)^{5.000} + (-0.003) \cdot (x$

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



Equations in the point **Tangent equation** in the point $x_0 = 1.000$:

$\text{f(x)} = 0.500 \cdot (x - 1.000) + 0.693$

Normal equation in the point $x_0 = 1.000$:

$\text{f(x)} = (-2.000) \cdot (x - 1.000) + 0.693$

Their graphs in $\delta = 1.000000$ coverage of the point $x_0 = 2.000000$