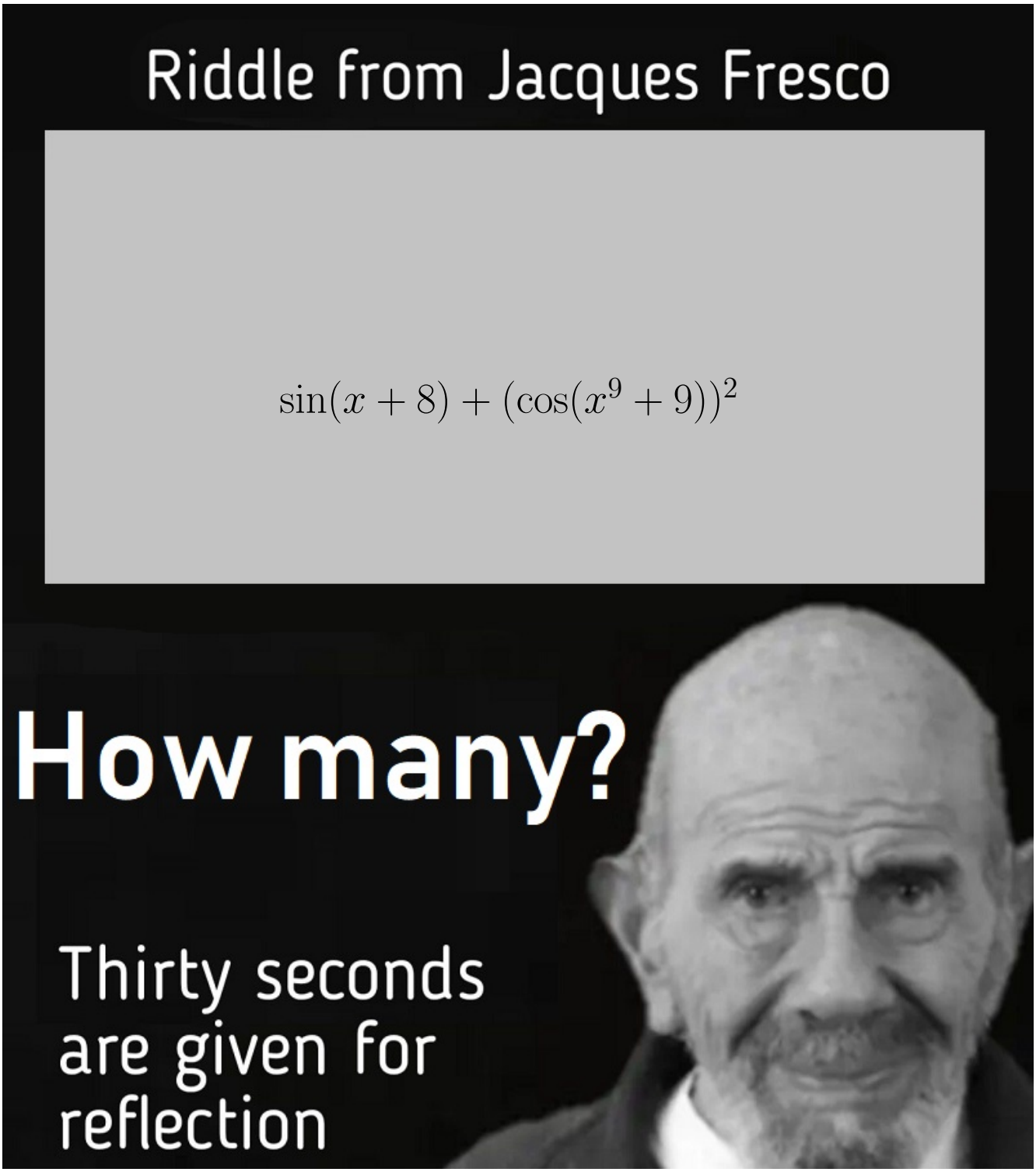
This is the beginning of an exciting subtraction of derivatives. Relax and enjoy!

By Tuzman Alexander

December 17, 2020

1 This is subtraction of 1'st derivative



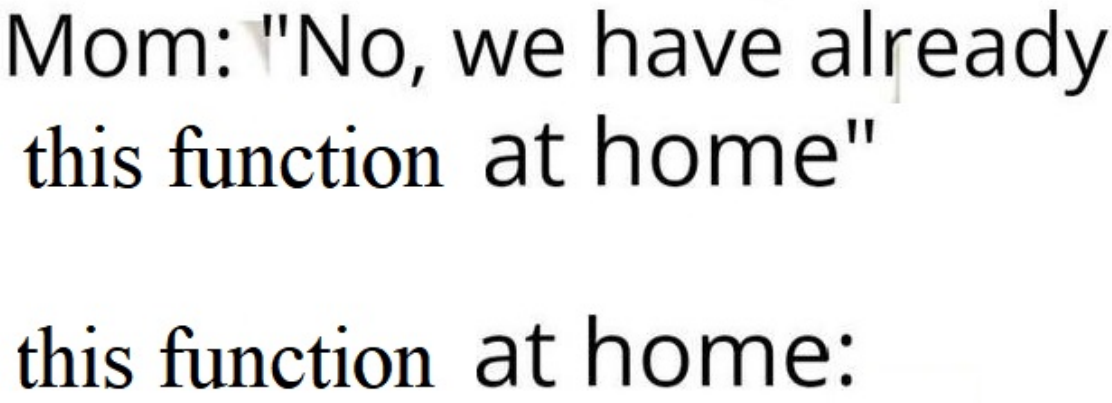
Let's differentiate expressions and find their derivatives!

9

0

Let's differentiate expressions and find their derivatives!

$$x$$



$$1$$

Let's differentiate expressions and find their derivatives!

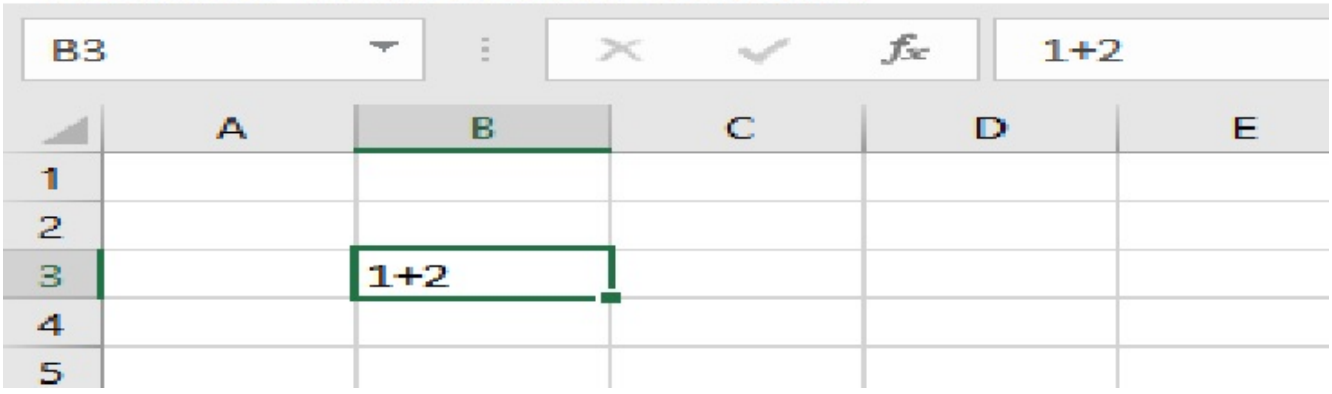
What I have studied in school:

$$x^9$$

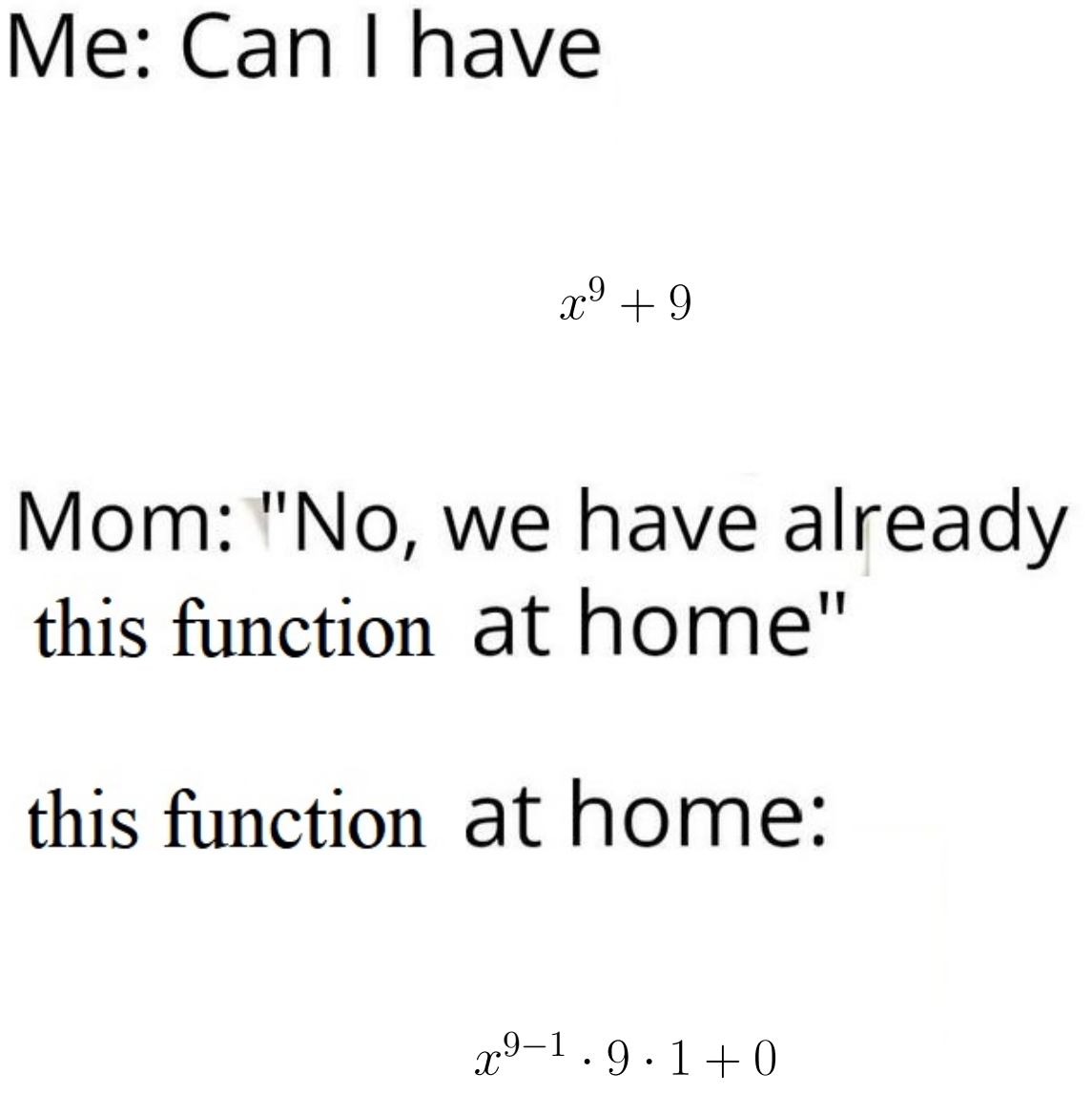
What I am studing in university:

$$x^{9-1} \cdot 9 \cdot 1$$

What I will need in life:



Let's differentiate expressions and find their derivatives!

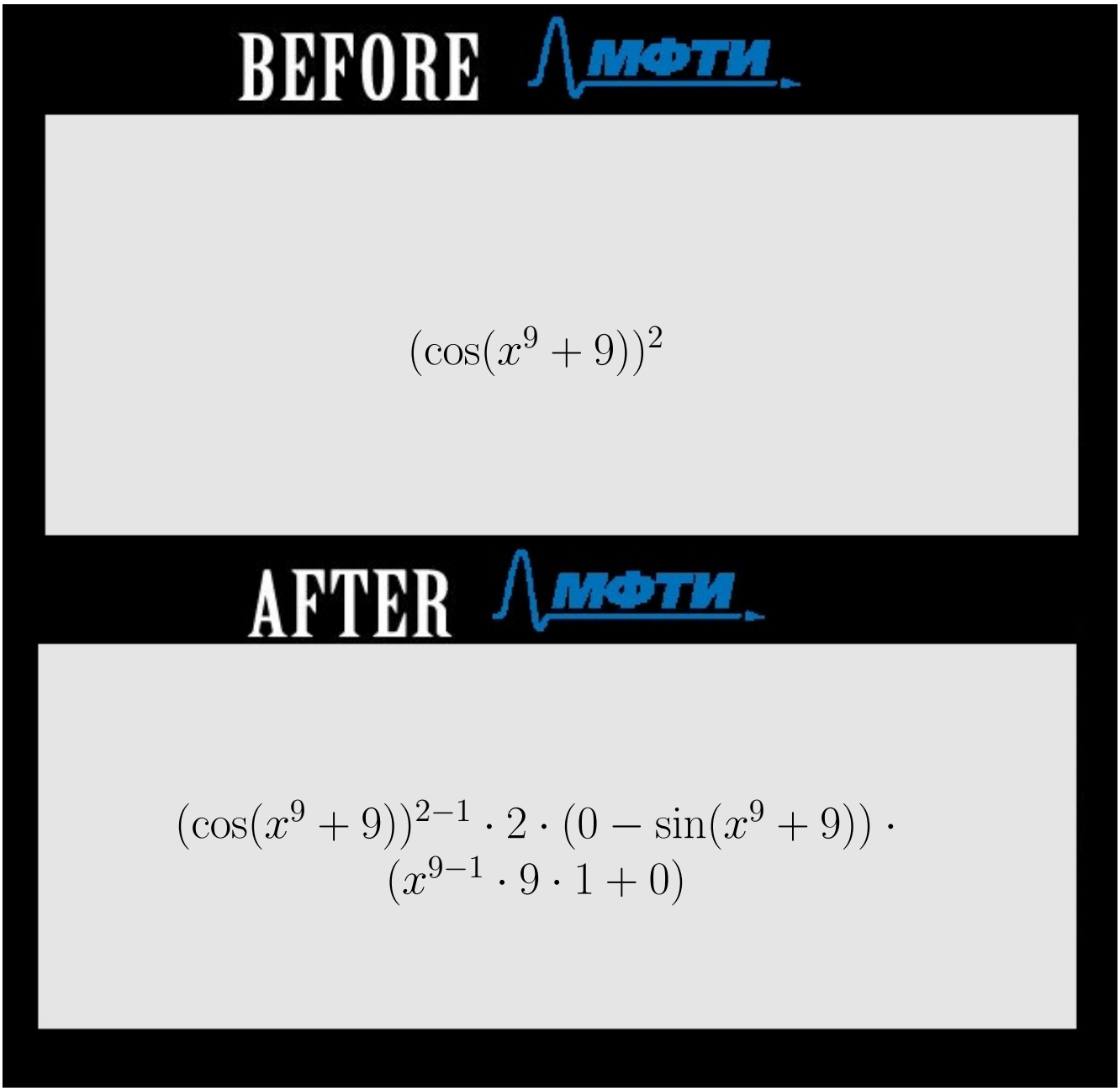


Let's differentiate expressions and find their derivatives!

$$\cos(x^9 + 9)$$

$$(0 - \sin(x^9 + 9)) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0)$$

Let's differentiate expressions and find their derivatives!



Let's differentiate expressions and find their derivatives!

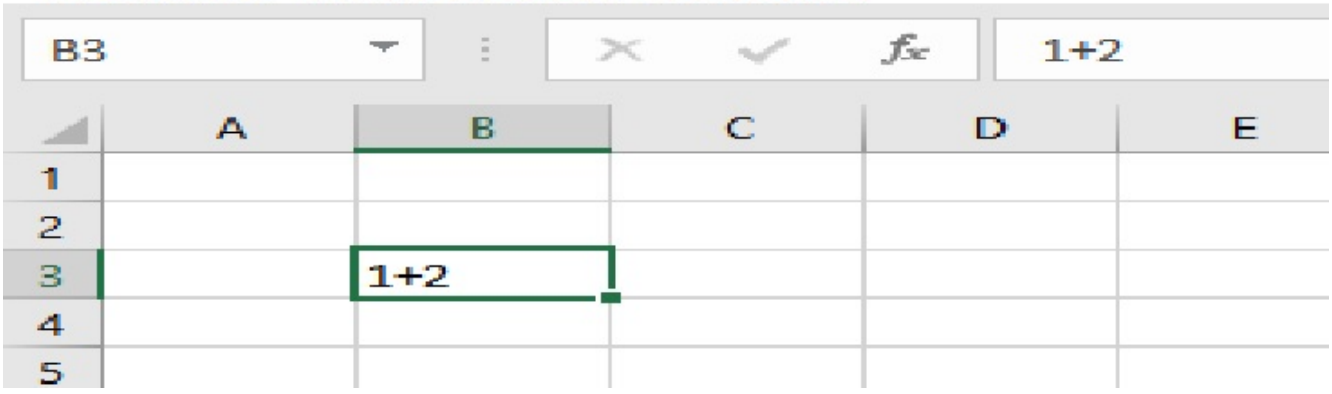
What I have studied in school:

8

What I am studing in university:

0

What I will need in life:



Let's differentiate expressions and find their derivatives!

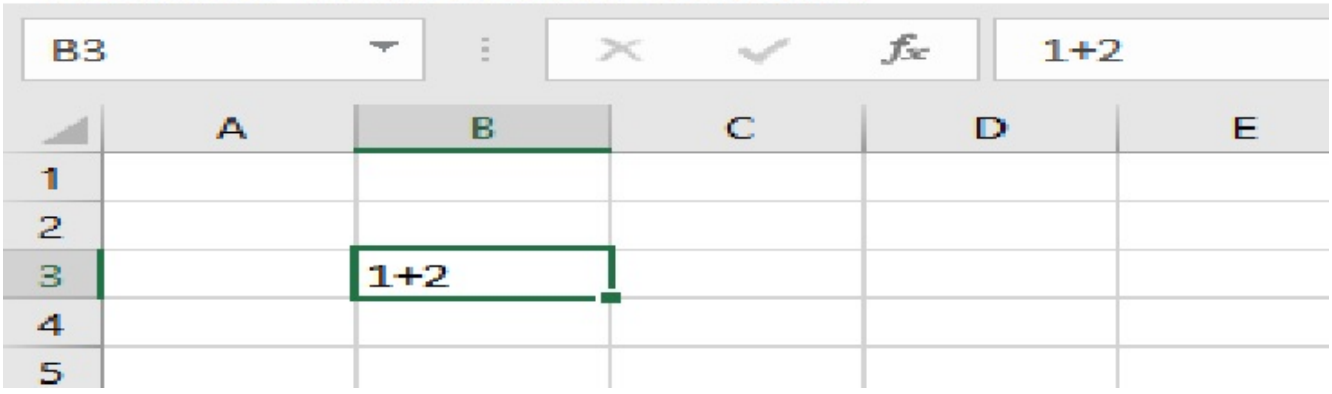
What I have studied in school:

$$x$$

What I am studing in university:

$$1$$

What I will need in life:



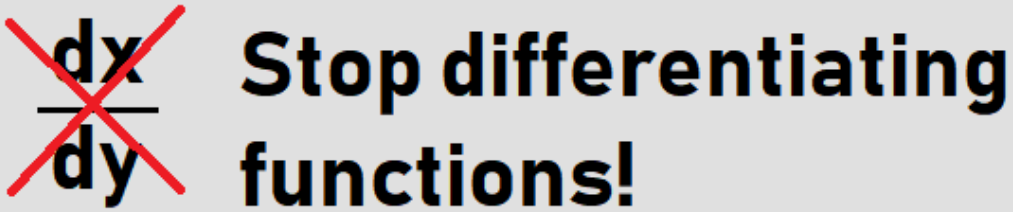
Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$x + 8$$

Functions in 2020:

$$1 + 0$$



Let's differentiate expressions and find their derivatives!

$$\sin(x+8)$$

$$\cos(x+8)\cdot(1+0)$$

Let's differentiate expressions and find their derivatives!

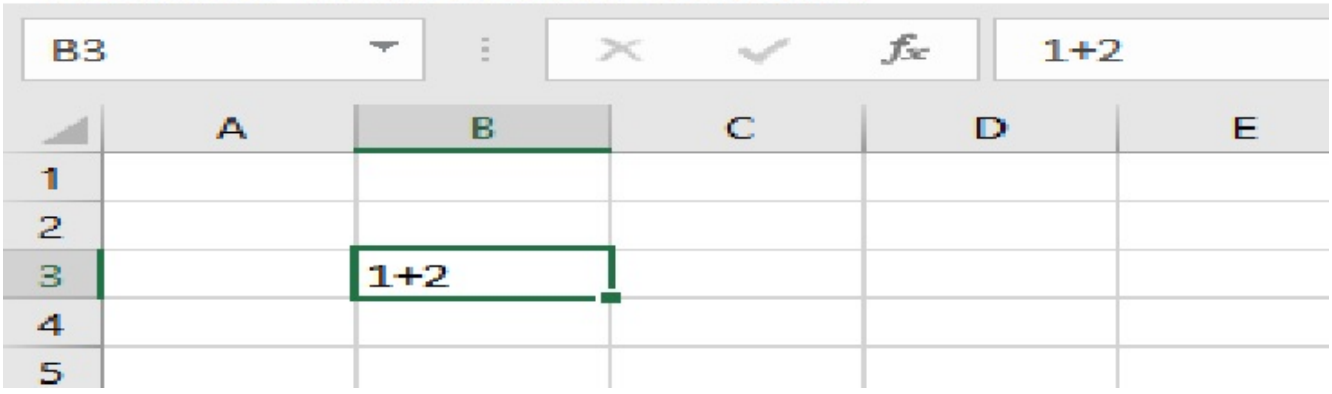
What I have studied in school:

$$\sin(x+8)+(\cos(x^9+9))^2$$

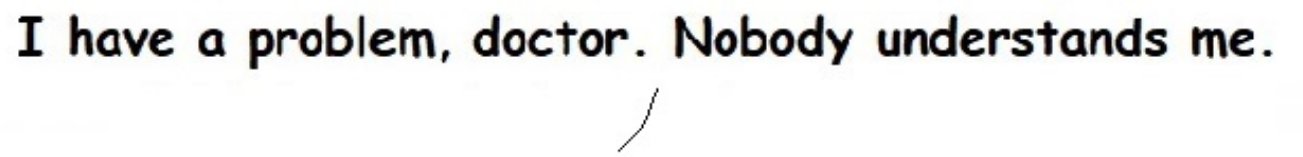
What I am studing in university:

$$\cos(x+8)\cdot(1+0)+(\cos(x^9+9))^{2-1}\cdot 2\cdot (0-\sin(x^9+9))\cdot(x^{9-1}\cdot 9\cdot 1+0)$$

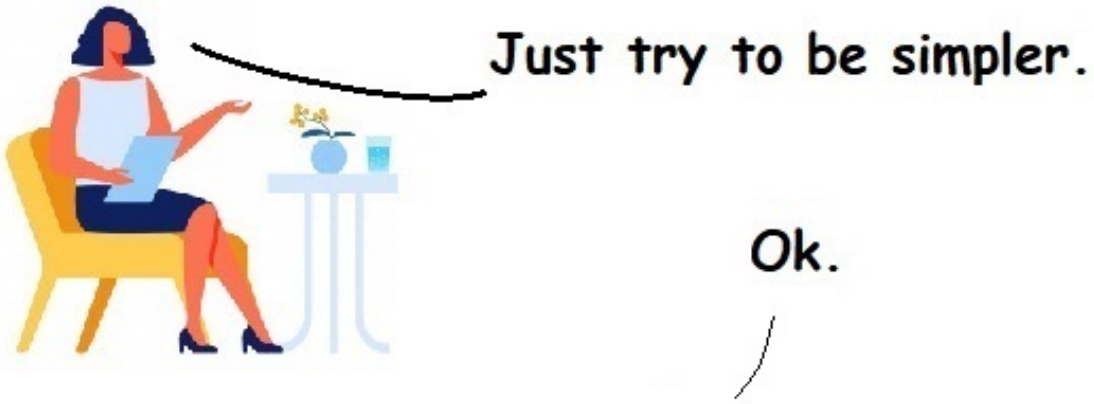
What I will need in life:



Let's make expressions simpler and easier!



$$\cos(x+8)\cdot(1+0)+(\cos(x^9+9))^{2-1}\cdot 2\cdot (0-\sin(x^9+9))\cdot(x^{9-1}\cdot 9\cdot 1+0)$$

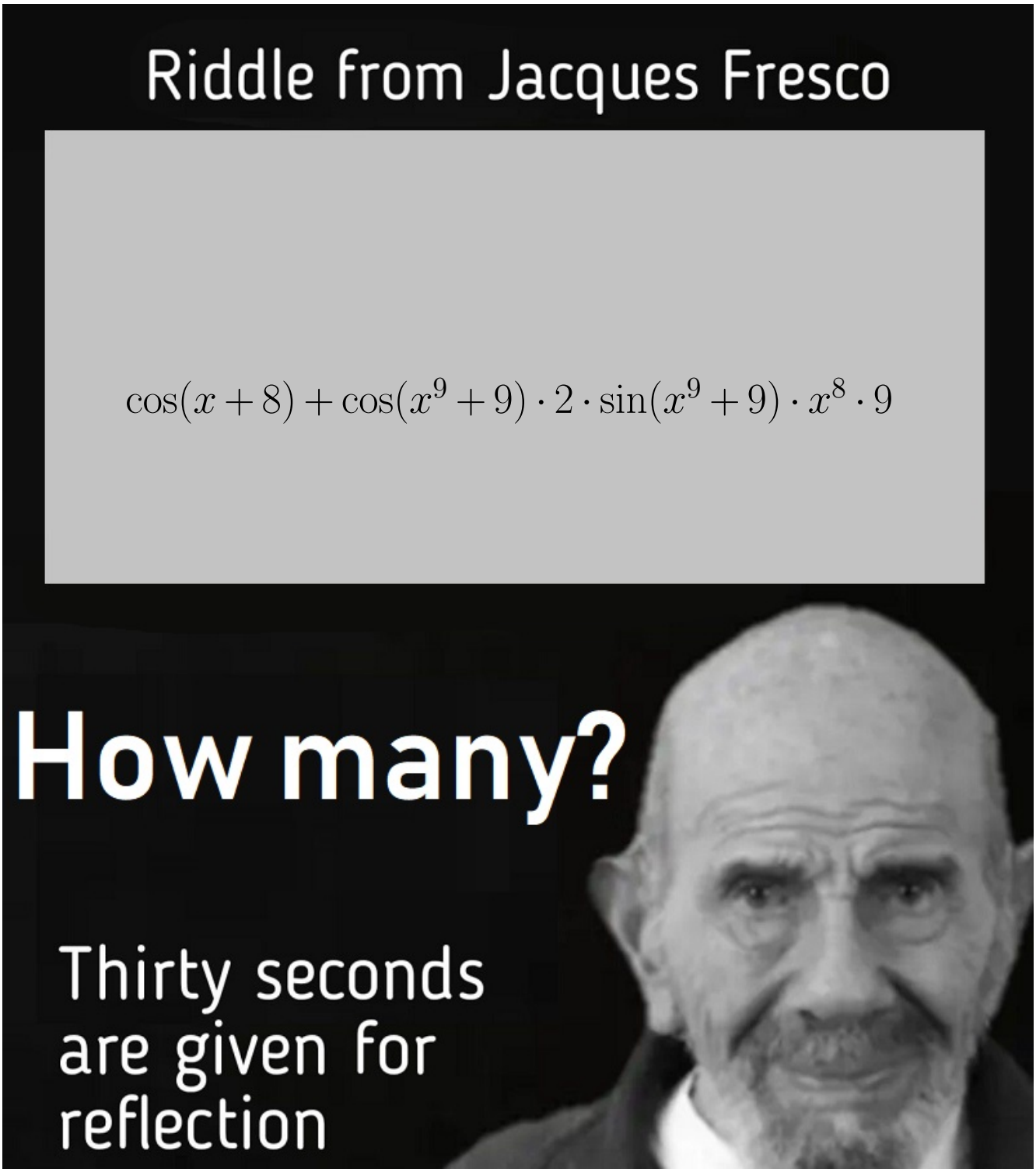


$$\cos(x+8)+\cos(x^9+9)\cdot 2\cdot\sin(x^9+9)\cdot x^8\cdot 9$$

$$\cos(x+8)+\cos(x^9+9)\cdot 2\cdot \sin(x^9+9)\cdot x^8\cdot 9$$

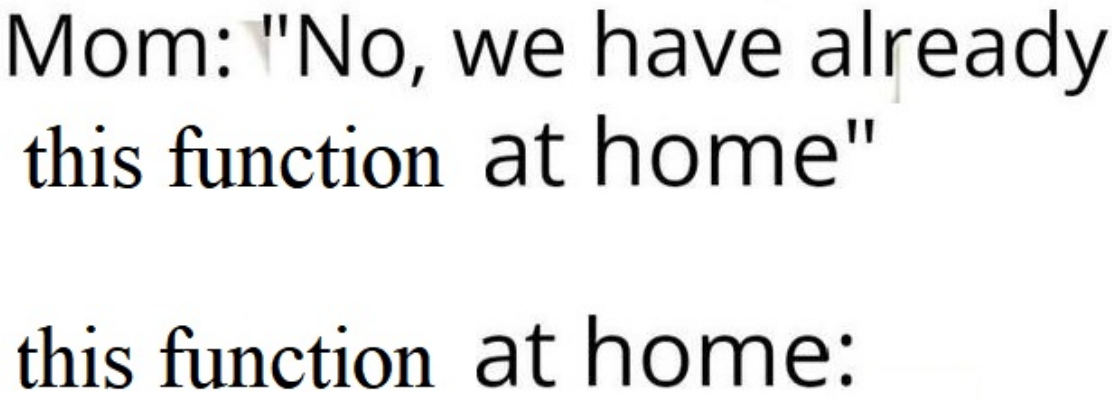
We have just calculated the derivative!

2 This is subtraction of 2'st derivative



Let's differentiate expressions and find their derivatives!

9



0

Let's differentiate expressions and find their derivatives!

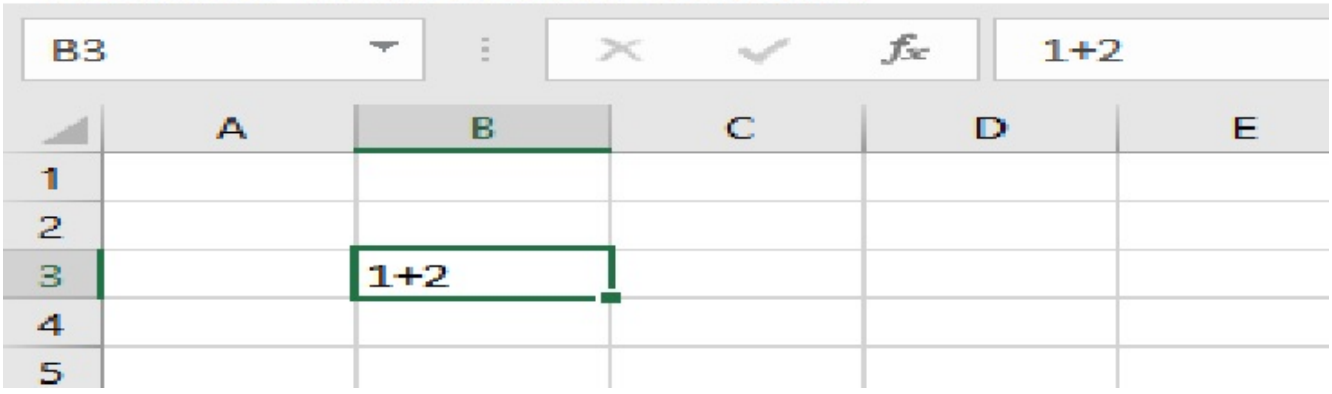
What I have studied in school:

$$x$$

What I am studing in university:

$$1$$

What I will need in life:



Let's differentiate expressions and find their derivatives!

Me: Can I have

$$x^8$$

Mom: "No, we have already this function at home"

this function at home:

$$x^{8-1} \cdot 8 \cdot 1$$

Let's differentiate expressions and find their derivatives!

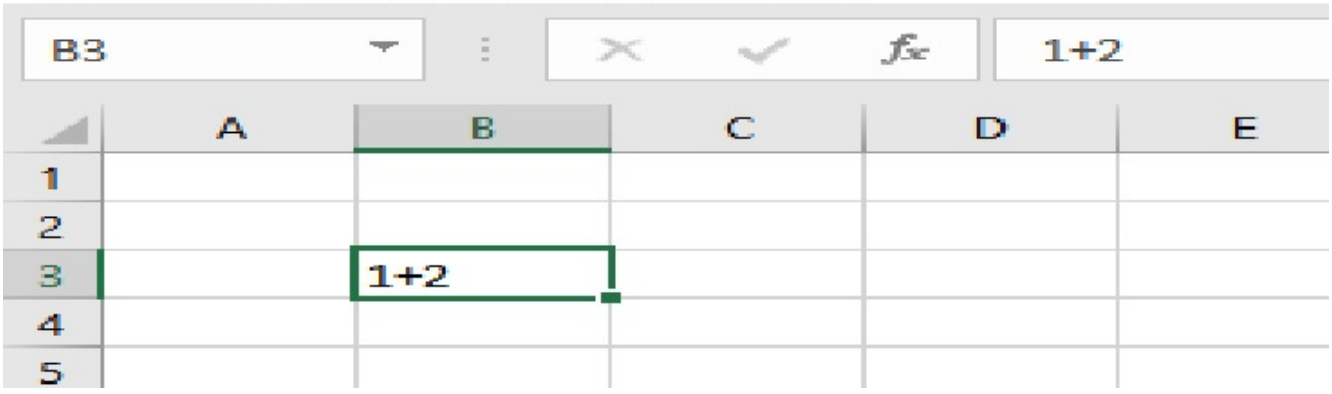
What I have studied in school:

$$x^8 \cdot 9$$

What I am studing in university:

$$x^{8-1} \cdot 8 \cdot 1 \cdot 9 + x^8 \cdot 0$$

What I will need in life:

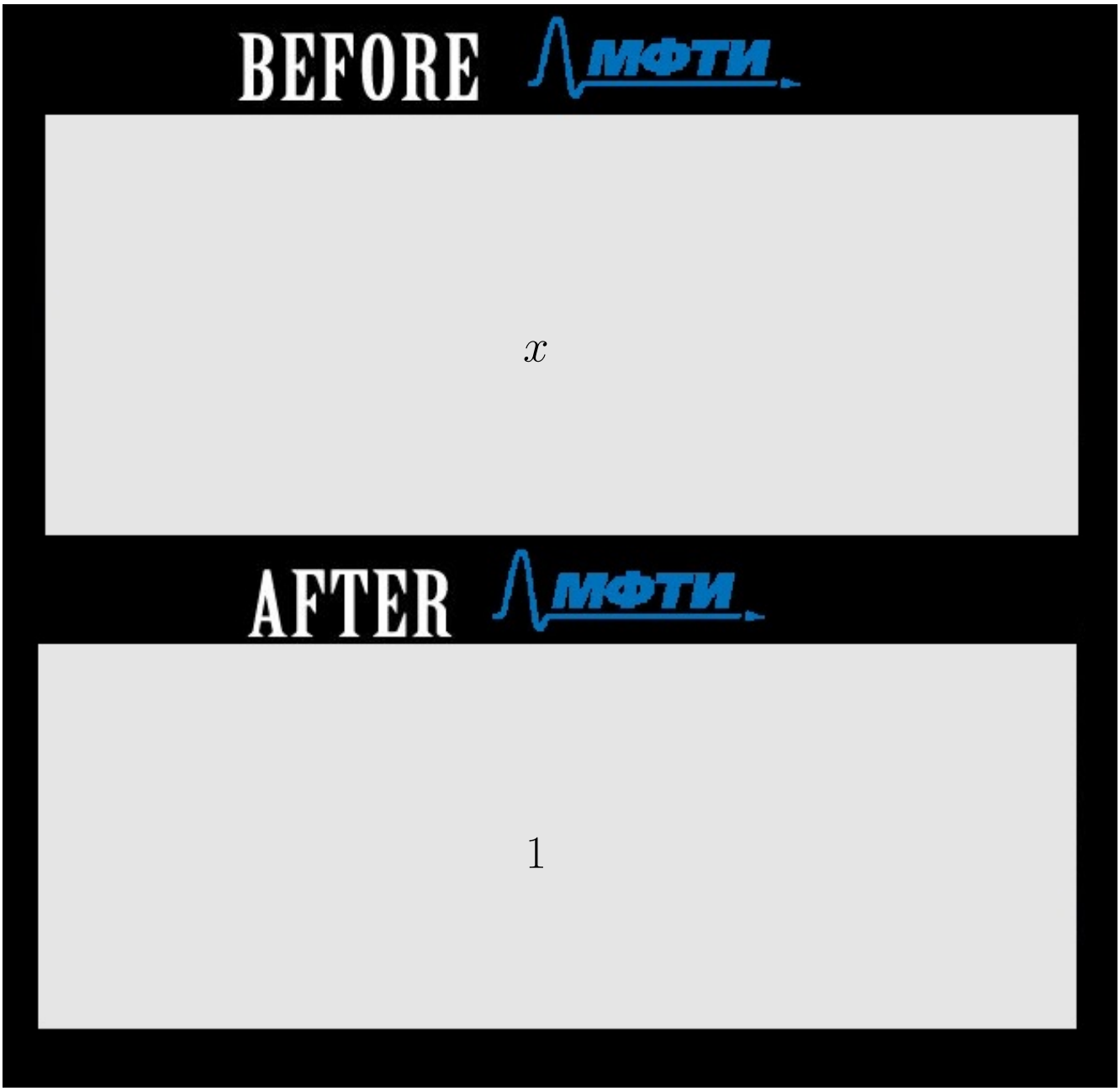


Let's differentiate expressions and find their derivatives!

9

0

Let's differentiate expressions and find their derivatives!



Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$x^9$$

Functions in 2020:

$$x^{9-1} \cdot 9 \cdot 1$$

Stop differentiating functions!

Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$x^9 + 9$$

Functions in 2020:

$$x^{9-1} \cdot 9 \cdot 1 + 0$$

Stop differentiating functions!

Let's differentiate expressions and find their derivatives!

$$\sin(x^9 + 9)$$

$$\cos(x^9 + 9) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0)$$

Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$\sin(x^9 + 9) \cdot x^8 \cdot 9$$

Functions in 2020:

$$\cos(x^9 + 9) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0) \cdot x^8 \cdot 9 + \sin(x^9 + 9) \cdot (x^{8-1} \cdot 8 \cdot 1 \cdot 9 + x^8 \cdot 0)$$

Stop differentiating functions!

Let's differentiate expressions and find their derivatives!

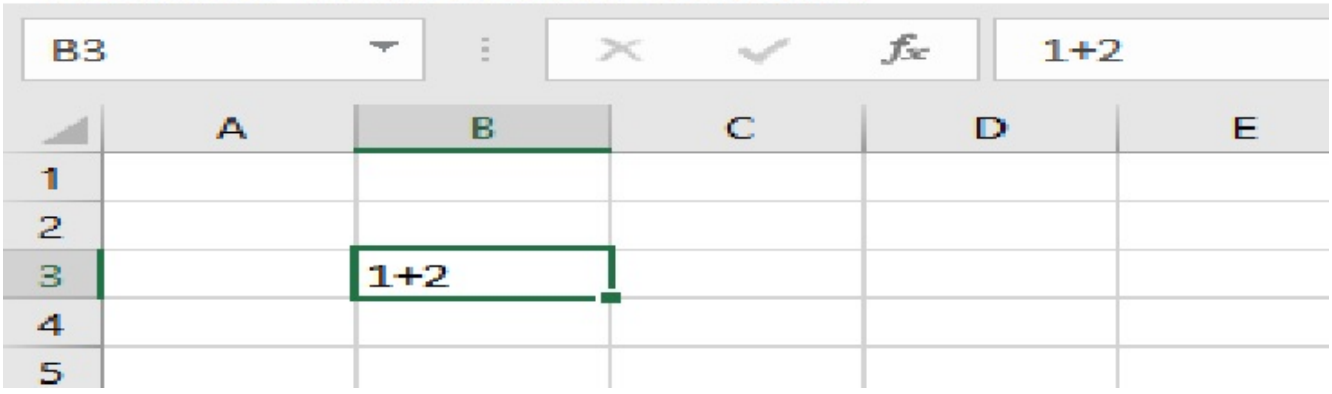
What I have studied in school:

$$2$$

What I am studing in university:

$$0$$

What I will need in life:



Let's differentiate expressions and find their derivatives!

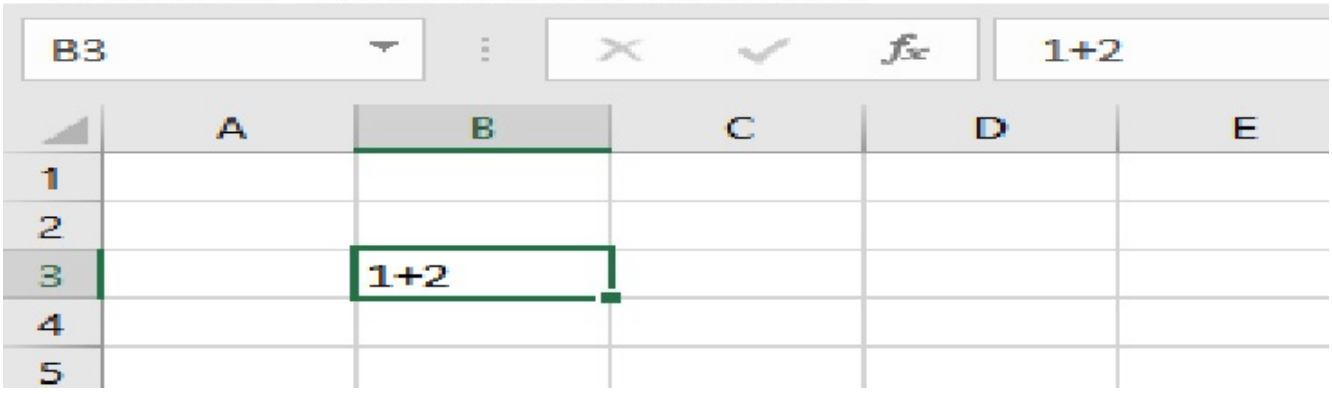
What I have studied in school:

9

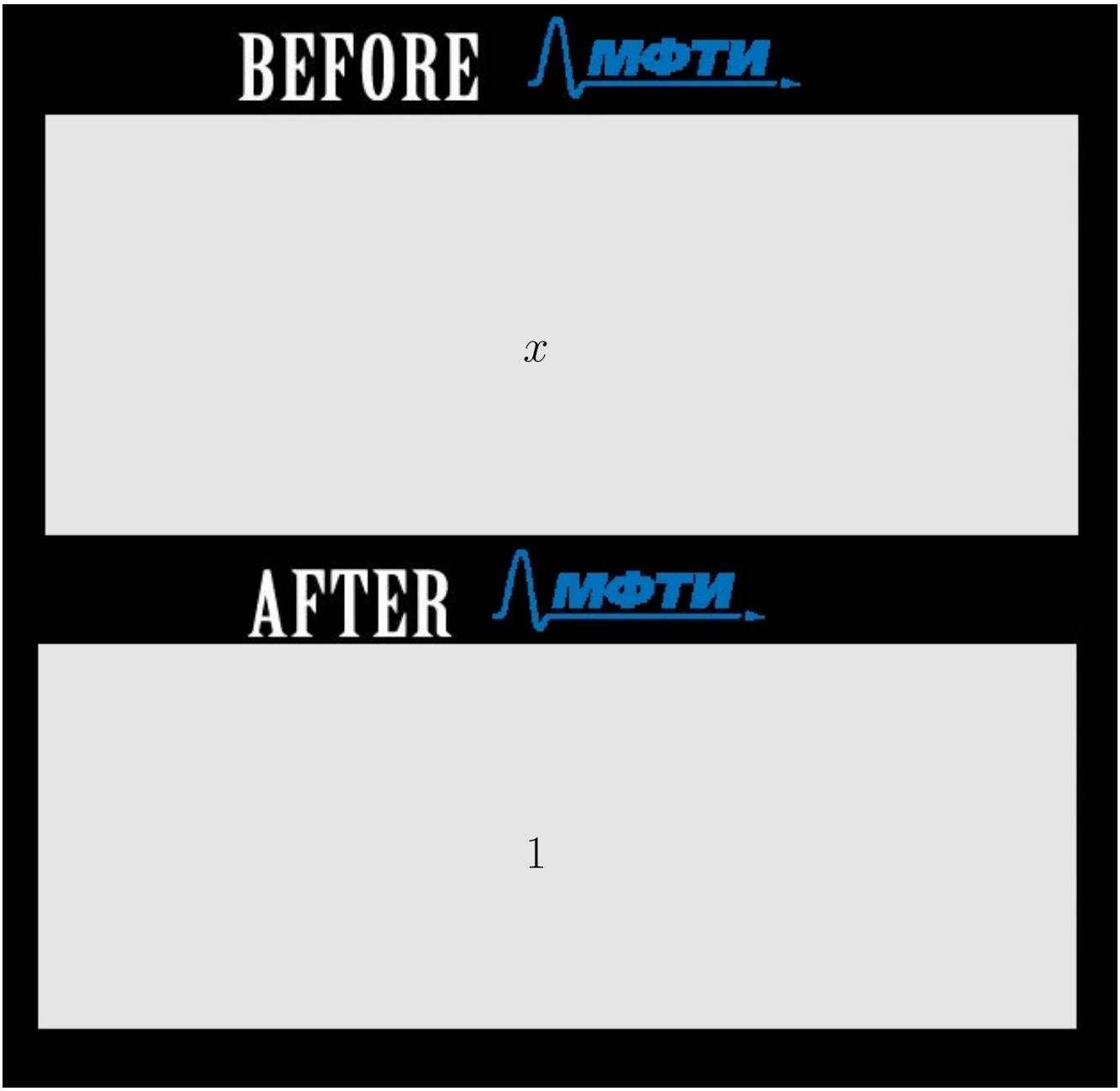
What I am studing in university:

0

What I will need in life:



Let's differentiate expressions and find their derivatives!



Let's differentiate expressions and find their derivatives!

x^9

$x^{9-1} \cdot 9 \cdot 1$

Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$x^9 + 9$$

Functions in 2020:

$$x^{9-1} \cdot 9 \cdot 1 + 0$$

Stop differentiating functions!

Let's differentiate expressions and find their derivatives!

Me: Can I have

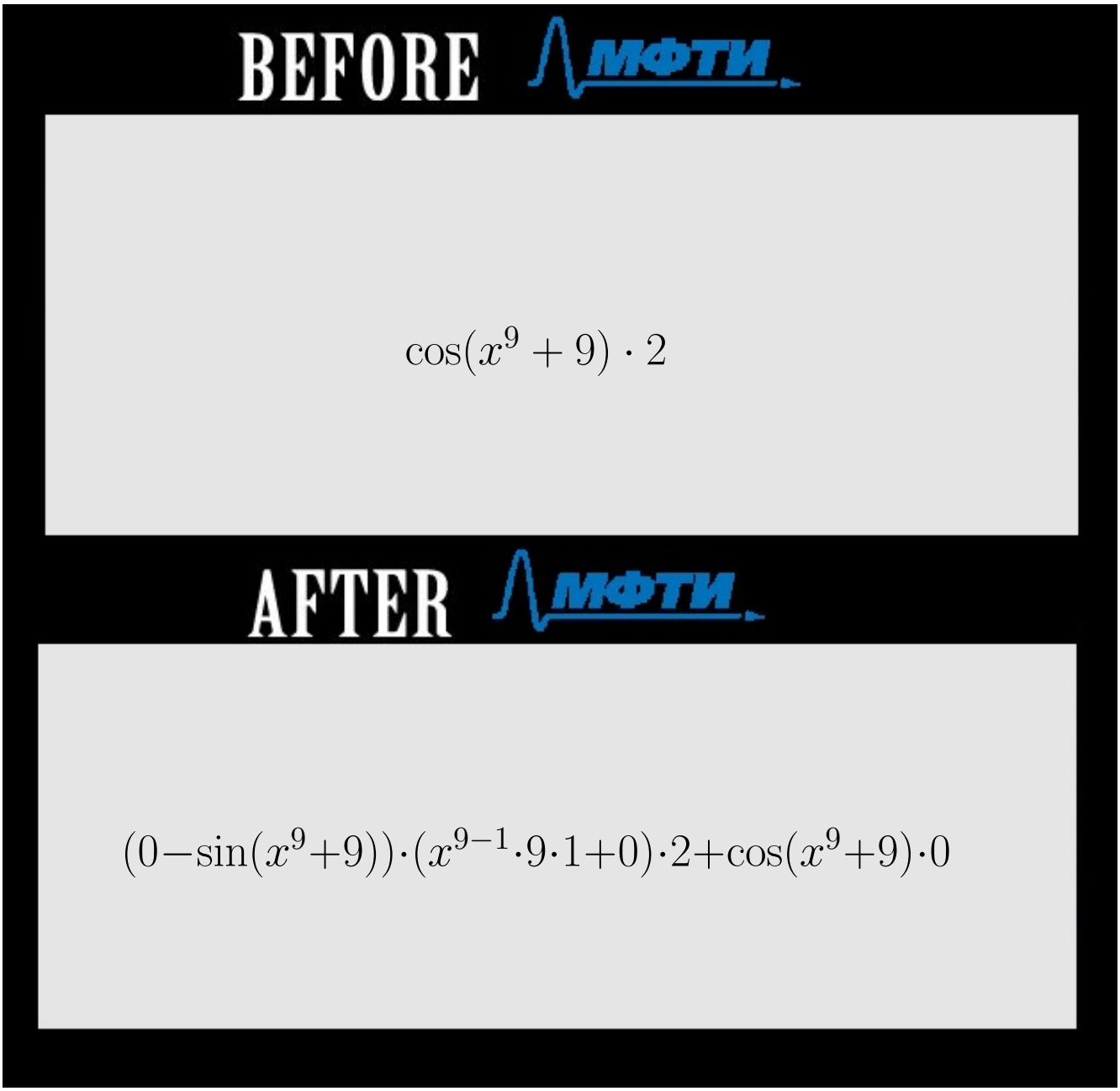
$$\cos(x^9 + 9)$$

Mom: "No, we have already this function at home"

this function at home:

$$(0 - \sin(x^9 + 9)) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0)$$

Let's differentiate expressions and find their derivatives!



Let's differentiate expressions and find their derivatives!

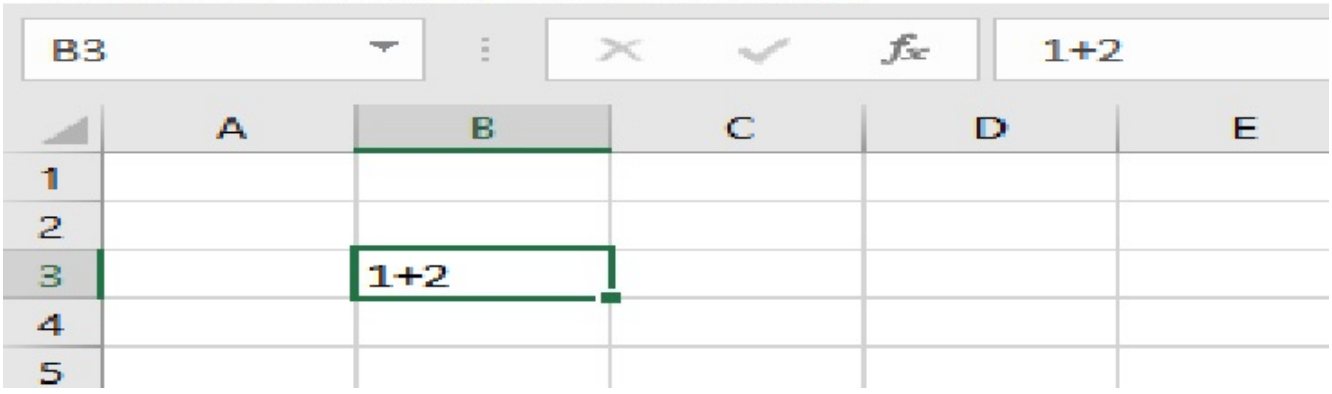
What I have studied in school:

$$\cos(x^9 + 9) \cdot 2 \cdot \sin(x^9 + 9) \cdot x^8 \cdot 9$$

What I am studing in university:

$$((0 - \sin(x^9 + 9)) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0) \cdot 2 + \cos(x^9 + 9) \cdot 0) \cdot \sin(x^9 + 9) \cdot x^8 \cdot 9 + \cos(x^9 + 9) \cdot 2 \cdot (\cos(x^9 + 9) \cdot (x^{9-1} \cdot 9 \cdot 1 + 0) \cdot x^8 \cdot 9 + \sin(x^9 + 9) \cdot (x^{8-1} \cdot 8 \cdot 1 \cdot 9 + x^8 \cdot 0))$$

What I will need in life:



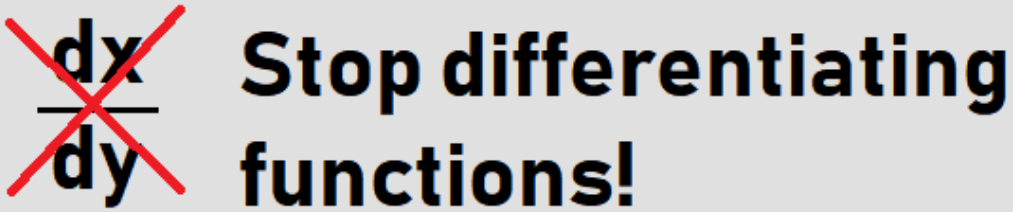
Let's differentiate expressions and find their derivatives!

Functions in 1970:

8

Functions in 2020:

0

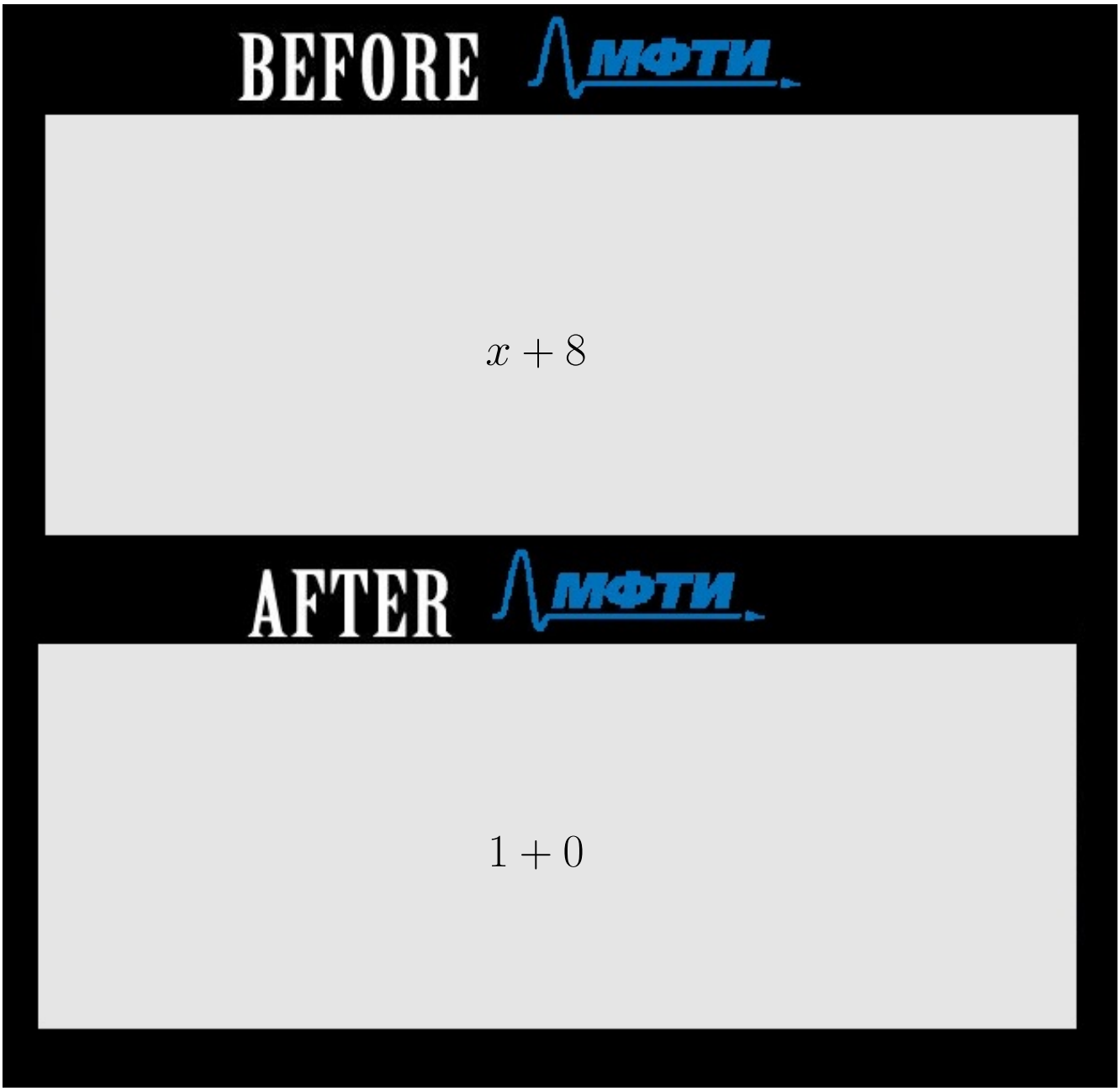


Let's differentiate expressions and find their derivatives!

x

1

Let's differentiate expressions and find their derivatives!



Let's differentiate expressions and find their derivatives!

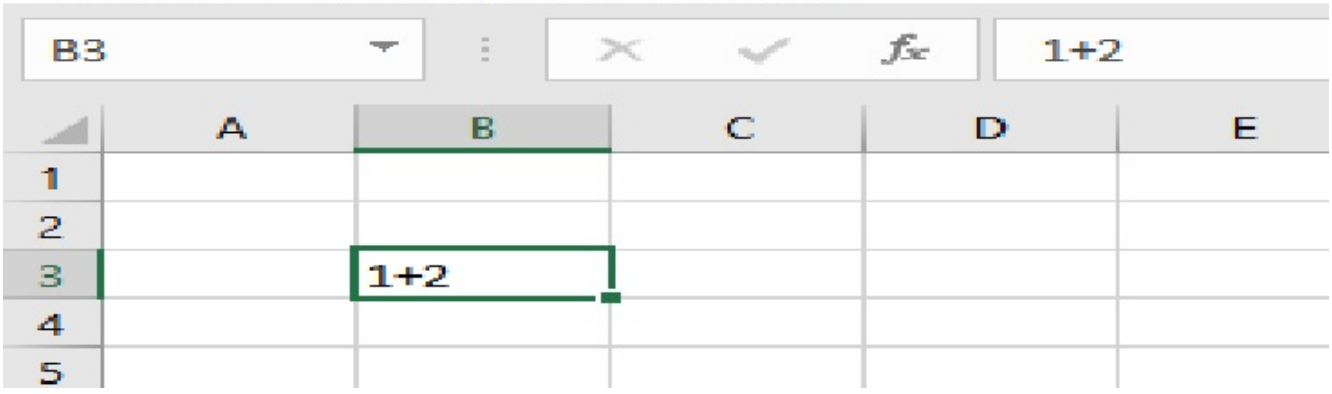
What I have studied in school:

$$\cos(x+8)$$

What I am studing in university:

$$(0-\sin(x+8))\cdot(1+0)$$

What I will need in life:



Let's differentiate expressions and find their derivatives!

Functions in 1970:

$$\cos(x+8)+\cos(x^9+9)\cdot 2\cdot\sin(x^9+9)\cdot x^8\cdot 9$$

Functions in 2020:

$$(0-\sin(x+8))\cdot(1+0)+((0-\sin(x^9+9))\cdot(x^{9-1}\cdot 9\cdot 1+0)\cdot 2+\cos(x^9+9)\cdot 0)\cdot\sin(x^9+9)\cdot x^8\cdot 9+\cos(x^9+9)\cdot 2\cdot(\cos(x^9+9)\cdot(x^{9-1}\cdot 9\cdot 1+0)\cdot x^8\cdot 9+\sin(x^9+9)\cdot(x^{8-1}\cdot 8\cdot 1\cdot 9+x^8\cdot 0))$$

~~$\frac{dx}{dy}$~~ **Stop differentiating functions!**

Let's make expressions simpler and easier!

Teacher: don't worry, tasks on exam will be like this:

$$\sin(x+8)+\sin(x^9+9)\cdot x^8\cdot 9\cdot 2\cdot \sin(x^9+9)\cdot x^8\cdot 9+\cos(x^9+9)\cdot 2\cdot(\cos(x^9+9)\cdot x^8\cdot 9\cdot x^8\cdot 9+\sin(x^9+9)\cdot x^7\cdot 8\cdot 9)$$

Tasks on exam:

$$(0-\sin(x+8))\cdot(1+0)+((0-\sin(x^9+9))\cdot(x^{9-1}\cdot 9\cdot 1+0)\cdot 2+\cos(x^9+9)\cdot 0)\cdot\sin(x^9+9)\cdot x^8\cdot 9+\cos(x^9+9)\cdot 2\cdot(\cos(x^9+9)\cdot(x^{9-1}\cdot 9\cdot 1+0)\cdot x^8\cdot 9+\sin(x^9+9)\cdot(x^{8-1}\cdot 8\cdot 1\cdot 9+x^8\cdot 0))$$

$$\sin(x+8)+\sin(x^9+9)\cdot x^8\cdot 9\cdot 2\cdot \sin(x^9+9)\cdot x^8\cdot 9+\cos(x^9+9)\cdot 2\cdot(\cos(x^9+9)\cdot x^8\cdot 9\cdot x^8\cdot 9+\sin(x^9+9)\cdot x^7\cdot 8\cdot 9)$$

We have just calculated the derivative!

That is all!
Source code is available on mv GitHub:

github.com/Allexande