MatematiCAL anal for economists

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Preface

This textbook is designed to assist economics students studying the basic course of mathematical analysis. It summarizes the entire mathematical analysis course taught to economists in the best undergraduate economics program in Eastern Europe.

The lectures include only the essential material, ensuring that students who have achieved top honors in national economics Olympiads are not overburdened and can maintain their sense of superiority over the rest of the world. After all, they likely mastered all this material in kindergarten (or at the latest, by first grade). The division of topics into lectures corresponds well to the actual pace of the course, which spans an entire semester. Almost all statements in the course are self-evident, and their proofs are left to the reader as straightforward exercises.

Chapter 1

Numbers

1.1 Basic Classes of Numbers

First, let's introduce the definitions of the basic classes of numbers that we will constantly work with throughout the course.

Definition 1 *Numbers 1, 2, 3, ... are called natural numbers. The notation for the set of all natural numbers is* $\mathbb{N}$.

Definition 2 *A number is called an integer if it is equal to... but you don't need this because everything in economics is positive.*

Definition 3 *A number is called rational if it can be represented as something above a line and something below a line.*

Definition 4 *A number is called irrational if it is not rational.*

Obvious Fact 1 *The sum of all natural numbers equals* $-1/12$.

Kindergarten Example: If Vasya had 2 apples and Petya took 1 apple from him, how many apples does Vasya have left? The answer is obviously $-1/12$, as any advanced mathematician knows.

Chapter 2

Derivative

2.1 Basic derivatives

Definition 5 *The definition of derivative is omitted because it is obvious.*

Everything in this chapter is so obvious that no additional explanations will be provided - we'll immediately proceed to analyze an example from kindergarten.

Let's calculate a simple derivative:

$$cos(sin(x)) + x^{3.00} \tag{2.1}$$

A good, solid task?

$$(sin(x))' = cos(x) \tag{2.2}$$

It is easy to see:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{2.3}$$

By the obvious theorem:

$$(x^{3.00})' = 3.00 \cdot x^{2.00} \tag{2.4}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(sin(x)) + x^{3.00})' = cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00} \tag{2.5}$$

Let's calculate a simple derivative:

$$cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00} \tag{2.6}$$

As already shown earlier:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{2.7}$$

It is obvious that:

$$(sin(x))' = cos(x) \tag{2.8}$$

A good, solid task?

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{2.9}$$

As already shown earlier:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{2.10}$$

A good, solid task?

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = {} & -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ & + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{2.11}$$

By the obvious theorem:

$$(x^{2.00})' = 2.00 \cdot x \tag{2.12}$$

It is common knowledge:

$$(3.00 \cdot x^{2.00})' = 3.00 \cdot 2.00 \cdot x \tag{2.13}$$

Should be known from school:

$$\begin{aligned}&(cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00})' \\ &\quad = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\qquad \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + 3.00 \cdot 2.00 \cdot x\end{aligned} \tag{2.14}$$

Chapter 3

Taylor

3.1 Taylor's formula with the remainder term (and why is it needed? Without it, everything is obvious)

Definition 6 *Taylor's formula is obvious, so no additional explanations will be given. Let's start straight with an example.*

At first the derivatives must be calcutated:

Let's calculate a simple derivative:

$$cos(sin(x)) + x^{3.00} \tag{3.1}$$

According to the theorem (which number?) from paragraph ??:

$$(sin(x))' = cos(x) \tag{3.2}$$

A good, solid task?

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.3}$$

By the obvious theorem:

$$(x^{3.00})' = 3.00 \cdot x^{2.00} \tag{3.4}$$

Plus a constant:

$$(cos(sin(x)) + x^{3.00})' = cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00} \tag{3.5}$$

Let's calculate a simple derivative:

$$cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00} \tag{3.6}$$

Should be known from school:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.7}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(x))' = cos(x) \tag{3.8}$$

Plus a constant:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.9}$$

As already shown earlier:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.10}$$

As already shown earlier:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = {} & -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ & + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.11}$$

By the obvious theorem:

$$(x^{2.00})' = 2.00 \cdot x \tag{3.12}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(3.00 \cdot x^{2.00})' = 3.00 \cdot 2.00 \cdot x \tag{3.13}$$

As already shown earlier:

$$\begin{aligned}&(cos(x) \cdot -1.00 \cdot sin(sin(x)) + 3.00 \cdot x^{2.00})' \\ &= -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + 3.00 \cdot 2.00 \cdot x\end{aligned} \tag{3.14}$$

Let's calculate a simple derivative:

$$\begin{aligned}&-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot \\ &-1.00 \cdot cos(x) \cdot cos(sin(x)) + 3.00 \cdot 2.00 \cdot x\end{aligned} \tag{3.15}$$

It is common knowledge:

$$(sin(x))' = cos(x) \tag{3.16}$$

A similar one can be proved:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.17}$$

It is obvious that:

$$(sin(x))' = cos(x) \tag{3.18}$$

According to the theorem (which number?) from paragraph ??:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.19}$$

It is easy to see:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.20}$$

If this is not obvious to you, try attending a lecture for a change:

$$\begin{aligned}(-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + \\ -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.21}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.22}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.23}$$

As already shown earlier:

$$(sin(x))' = cos(x) \tag{3.24}$$

It is easy to see:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.25}$$

As already shown earlier:

$$\begin{aligned}(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \\ \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{aligned} \tag{3.26}$$

A good, solid task?

$$\begin{aligned}(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) \\ + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.27}$$

If this is not obvious to you, try attending a lecture for a change:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\ \cdot cos(sin(x)) + cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \\ \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.28}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' \\ = -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\ \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\ -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.29}$$

Plus a constant:

$$(2.00 \cdot x)' = 2.00 \tag{3.30}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(3.00 \cdot 2.00 \cdot x)' = 6.00 \tag{3.31}$$

Plus a constant:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + 3.00 \\ \cdot 2.00 \cdot x)' = -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\ \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + 6.00 \tag{3.32}$$

Let's calculate a simple derivative:

$$-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\ \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \\ \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\ + 6.00 \tag{3.33}$$

Should be known from school:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.34}$$

It is easy to see:

$$(-1.00 \cdot cos(x))' = -1.00 \cdot -1.00 \cdot sin(x) \tag{3.35}$$

According to the theorem (which number?) from paragraph ??:

$$(sin(x))' = cos(x) \tag{3.36}$$

Plus a constant:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.37}$$

A similar one can be proved:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.38}$$

A good, solid task?

$$(-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.39}$$

It is common knowledge:

$$(sin(x))' = cos(x) \tag{3.40}$$

Plus a constant:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.41}$$

As already shown earlier:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.42}$$

It is common knowledge:

$$(sin(x))' = cos(x) \tag{3.43}$$

Let's imagine this household as:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.44}$$

As already shown earlier:

$$(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.45}$$

A similar one can be proved:

$$(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.46}$$

A similar one can be proved:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.47}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.48}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(x))' = cos(x) \tag{3.49}$$

If this is not obvious to you, try attending a lecture for a change:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.50}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.51}$$

It is easy to see:

$$(sin(x))' = cos(x) \tag{3.52}$$

A good, solid task?

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.53}$$

If this is not obvious to you, try attending a lecture for a change:

$$(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.54}$$

It is easy to see:

$$(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.55}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.56}$$

If this is not obvious to you, try attending a lecture for a change:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.57}$$

A similar one can be proved:

$$(sin(x))' = cos(x) \tag{3.58}$$

A good, solid task?

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.59}$$

A good, solid task?

$$(sin(x))' = cos(x) \tag{3.60}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.61}$$

It is common knowledge:

$$\begin{aligned}(-1.00 \cdot sin(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \\ \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{aligned} \tag{3.62}$$

A good, solid task?

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.63}$$

A good, solid task?

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.64}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.65}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.66}$$

It is common knowledge:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.67}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.68}$$

It is common knowledge:

$$(cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \tag{3.69}$$

A similar one can be proved:

$$(-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \tag{3.70}$$

It is common knowledge:

$$(-1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.71}$$

Plus a constant:

$$(cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.72}$$

According to the theorem (which number?) from paragraph ??:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.73}$$

A good, solid task?

$$
\begin{aligned}
&(-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\
&\cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \\
&\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \\
&\quad \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \\
&\quad \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot \\
&\quad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + cos(x) \\
&\quad \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))
\end{aligned} \tag{3.74}
$$

According to the theorem (which number?) from paragraph ??:

$$
\begin{aligned}
&(-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\
&\cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \\
&\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + 6.00)' = \\
&\quad -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \\
&\quad \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot \\
&\quad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + cos(x) \\
&\quad \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))
\end{aligned} \tag{3.75}
$$

Let's calculate a simple derivative:

$$
\begin{aligned}
&-1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot \\
&-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \\
&\cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \\
&\cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + \\
&-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \\
&\cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \\
&\cdot -1.00 \cdot sin(sin(x))) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \\
&\cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&+ cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \\
&\cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot \\
&-1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))
\end{aligned}
\tag{3.76}
$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.77}$$

As already shown earlier:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.78}$$

As already shown earlier:

$$(-1.00 \cdot -1.00 \cdot sin(x))' = -1.00 \cdot -1.00 \cdot cos(x) \tag{3.79}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.80}$$

If this is not obvious to you, try attending a lecture for a change:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.81}$$

A similar one can be proved:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.82}$$

As already shown earlier:

$$
\begin{aligned}
&(-1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)))' \\
&= -1.00 \cdot -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + \\
&\quad -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))
\end{aligned}
\tag{3.83}
$$

It is obvious that:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.84}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(-1.00 \cdot cos(x))' = -1.00 \cdot -1.00 \cdot sin(x) \tag{3.85}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.86}$$

Let's imagine this household as:

$$(sin(x))' = cos(x) \tag{3.87}$$

A similar one can be proved:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.88}$$

According to the theorem (which number?) from paragraph ??:

$$\begin{aligned}(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \\ \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{aligned} \tag{3.89}$$

As already shown earlier:

$$\begin{aligned}(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) \\ + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.90}$$

It is obvious that:

$$\begin{aligned}&(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' \\ &= -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ &\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.91}$$

It is common knowledge:

$$\begin{aligned}&(-1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ &\cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \\ &+ -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot \\ &-1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ &\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.92}$$

A good, solid task?

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.93}$$

It is obvious that:

$$(-1.00 \cdot cos(x))' = -1.00 \cdot -1.00 \cdot sin(x) \tag{3.94}$$

A similar one can be proved:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.95}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.96}$$

As already shown earlier:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.97}$$

Plus a constant:

$$\begin{aligned}(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \\ \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{aligned} \tag{3.98}$$

It is easy to see:

$$\begin{aligned}(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) \\ + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.99}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$\begin{aligned}&(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' \\ &\quad = -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ &\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))\end{aligned} \tag{3.100}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.101}$$

Let's imagine this household as:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.102}$$

A similar one can be proved:

$$(sin(x))' = cos(x) \tag{3.103}$$

A good, solid task?

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.104}$$

Plus a constant:

$$(sin(x))' = cos(x) \tag{3.105}$$

Should be known from school:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.106}$$

Let's imagine this household as:

$$\begin{aligned}(-1.00 \cdot sin(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \\ \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{aligned} \tag{3.107}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.108}$$

It is easy to see:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.109}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.110}$$

If this is not obvious to you, try attending a lecture for a change:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.111}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.112}$$

It is obvious that:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.113}$$

Plus a constant:

$$\begin{aligned}(cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = {} & -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ & -1.00 \cdot sin(sin(x)) + cos(x) \\ & \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ & \quad + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.114}$$

A similar one can be proved:

$$(-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\ \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \tag{3.115}$$

It is common knowledge:

$$(-1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' \\ = -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \\ + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.116}$$

A good, solid task?

$$(-1.00 \cdot sin(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot cos(x) \\ \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + \\ -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.117}$$

It is obvious that:

$$(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \\ \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\ + -1.00 \cdot cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\ \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\ \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.118}$$

Plus a constant:

$$
\begin{aligned}
&(-1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \\
&\quad \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot \\
&\qquad -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\
&\qquad \cdot cos(sin(x)) + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \\
&\qquad \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\qquad + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\qquad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\qquad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))
\end{aligned} \tag{3.119}
$$

It is easy to see:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.120}$$

It is common knowledge:

$$(-1.00 \cdot cos(x))' = -1.00 \cdot -1.00 \cdot sin(x) \tag{3.121}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.122}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(sin(x))' = cos(x) \tag{3.123}$$

As already shown earlier:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.124}$$

A similar one can be proved:

$$
\begin{aligned}
(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \\
\cdot cos(x) \cdot -1.00 \cdot sin(sin(x))
\end{aligned} \tag{3.125}
$$

A similar one can be proved:

$$
\begin{aligned}
(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) \\
+ cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))
\end{aligned} \tag{3.126}
$$

A similar one can be proved:

$$(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' \\ = -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\ \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.127}$$

Let's imagine this household as:

$$(sin(x))' = cos(x) \tag{3.128}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.129}$$

If this is not obvious to you, try attending a lecture for a change:

$$(sin(x))' = cos(x) \tag{3.130}$$

If this is not obvious to you, try attending a lecture for a change:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.131}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(x))' = cos(x) \tag{3.132}$$

If this is not obvious to you, try attending a lecture for a change:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.133}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(-1.00 \cdot sin(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \\ \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.134}$$

If this is not obvious to you, try attending a lecture for a change:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.135}$$

If this is not obvious to you, try attending a lecture for a change:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.136}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(sin(x))' = cos(x) \tag{3.137}$$

As already shown earlier:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.138}$$

A good, solid task?

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.139}$$

Plus a constant:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = {} & -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ & + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.140}$$

Let's imagine this household as:

$$\begin{aligned}(cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = {} & -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ & -1.00 \cdot sin(sin(x)) + cos(x) \\ & \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ & + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.141}$$

It is common knowledge:

$$\begin{aligned}&(-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ &= -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\ &\quad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.142}$$

It is common knowledge:

$$\begin{aligned}&(-1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' \\ &= -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \\ &\quad + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))\end{aligned} \tag{3.143}$$

It is easy to see:

$$\begin{aligned}&(-1.00 \cdot sin(x) \cdot -1.00 \\ &\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot cos(x) \\ &\quad \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + \\ &\quad -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ &\quad -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))\end{aligned} \tag{3.144}$$

Should be known from school:

$$(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \cdot cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \tag{3.145}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.146}$$

Let's imagine this household as:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.147}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(sin(x))' = cos(x) \tag{3.148}$$

It is obvious that:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.149}$$

A similar one can be proved:

$$(sin(x))' = cos(x) \tag{3.150}$$

A good, solid task?

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.151}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(-1.00 \cdot sin(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.152}$$

Plus a constant:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.153}$$

It is obvious that:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.154}$$

It is common knowledge:

$$(sin(x))' = cos(x) \tag{3.155}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.156}$$

Plus a constant:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.157}$$

It is obvious that:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.158}$$

According to the theorem (which number?) from paragraph ??:

$$\begin{aligned}(cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ -1.00 \cdot sin(sin(x)) + cos(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.159}$$

Plus a constant:

$$\begin{aligned}&(-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ &= -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\ &\cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.160}$$

A similar one can be proved:

$$\begin{aligned}&(-1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' \\ &= -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \\ &+ -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))\end{aligned} \tag{3.161}$$

It is easy to see:

$$\begin{aligned}&(-1.00 \cdot sin(x) \cdot -1.00 \\ &\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))' = -1.00 \cdot cos(x) \\ &\cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + \\ &-1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot \\ &-1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\ &\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))\end{aligned} \tag{3.162}$$

Let's imagine this household as:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.163}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.164}$$

As already shown earlier:

$$(-1.00 \cdot cos(x))' = -1.00 \cdot -1.00 \cdot sin(x) \tag{3.165}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(sin(x))' = cos(x) \tag{3.166}$$

Understanding this transformation is left to the reader as a simple exercise:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.167}$$

If this is not obvious to you, try attending a lecture for a change:

$$\begin{split}(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + \\ -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))\end{split} \tag{3.168}$$

As already shown earlier:

$$(sin(x))' = cos(x) \tag{3.169}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.170}$$

A similar one can be proved:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.171}$$

If you don't understand this obvious transformation, then you need to go into a program where they don't study mathematical analys:

$$(sin(x))' = cos(x) \tag{3.172}$$

A similar one can be proved:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.173}$$

It is obvious that:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.174}$$

Understanding this transformation is left to the reader as a simple exercise:

$$\begin{aligned}(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))\end{aligned} \tag{3.175}$$

Should be known from school:

$$\begin{aligned}&(-1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ &\quad = -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\ &\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.176}$$

As already shown earlier:

$$\begin{aligned}&(-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ &\quad = -1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \\ &\qquad \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\ &\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))\end{aligned} \tag{3.177}$$

Should be known from school:

$$(sin(x))' = cos(x) \tag{3.178}$$

Should be known from school:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.179}$$

It is common knowledge:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.180}$$

If this is not obvious to you, try attending a lecture for a change:

$$(sin(x))' = cos(x) \tag{3.181}$$

It is common knowledge:

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.182}$$

Should be known from school:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.183}$$

It is easy to see:

$$(cos(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) \\ + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.184}$$

If this is not obvious to you, try attending a lecture for a change:

$$(-1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))' \\ = -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\ \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \tag{3.185}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.186}$$

It is obvious that:

$$(sin(x))' = cos(x) \tag{3.187}$$

Should be known from school:

$$(-1.00 \cdot sin(x))' = -1.00 \cdot cos(x) \tag{3.188}$$

As already shown earlier:

$$(sin(x))' = cos(x) \tag{3.189}$$

A good, solid task?

$$(sin(sin(x)))' = cos(x) \cdot cos(sin(x)) \tag{3.190}$$

Should be known from school:

$$(-1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.191}$$

It is common knowledge:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + \\ -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) \tag{3.192}$$

It is obvious that:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.193}$$

It is obvious that:

$$(cos(x))' = -1.00 \cdot sin(x) \tag{3.194}$$

As already shown earlier:

$$(sin(x))' = cos(x) \tag{3.195}$$

As already shown earlier:

$$(cos(sin(x)))' = cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.196}$$

According to the theorem (which number?) from paragraph ??:

$$(cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) \tag{3.197}$$

Plus a constant:

$$(-1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.198}$$

A good, solid task?

$$(cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.199}$$

Should be known from school:

$$(-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))' = -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \tag{3.200}$$

Let's imagine this household as:

$$(cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))' = -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))) \tag{3.201}$$

As already shown earlier:

$$
\begin{aligned}
&(-1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))' = \\
&\quad -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\
&\quad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))
\end{aligned} \tag{3.202}
$$

Understanding this transformation is left to the reader as a simple exercise:

$$
\begin{aligned}
&(-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))))' = \\
&\quad -1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \\
&\quad \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\
&\quad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))
\end{aligned} \tag{3.203}
$$

It is obvious that:

$$(-1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))))' = -1.00 \cdot (-1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))) \tag{3.204}$$

Let's imagine this household as:

$$(cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))))' = -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + -1.00 \cdot sin(x) \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))) \tag{3.205}$$

Should be known from school:

$$
\begin{aligned}
&(-1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\quad \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))))' = \\
&\qquad -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\qquad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\qquad + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\qquad \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\qquad + cos(x) \cdot -1.00 \cdot (-1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot \\
&\qquad -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\qquad \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\
&\qquad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)))))
\end{aligned}
\tag{3.206}
$$

If this is not obvious to you, try attending a lecture for a change:

$$
\begin{aligned}
&(-1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\quad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\quad \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))))' = \\
&\qquad -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\qquad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\qquad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\qquad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\qquad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\qquad\qquad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\qquad + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\qquad \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\qquad + cos(x) \cdot -1.00 \cdot (-1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot \\
&\qquad -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad\qquad + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad\qquad + -1.00 \cdot sin(x) \\
&\qquad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\qquad\qquad + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\qquad \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\
&\qquad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))))
\end{aligned} \tag{3.207}
$$

As already shown earlier:

$$
\begin{aligned}
&(-1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \\
&\cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \\
&\cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&+ -1.00 \cdot cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&+ cos(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))))' = \\
&\quad -1.00 \cdot -1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \\
&\quad \cdot cos(sin(x)) + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \\
&\quad \cdot -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\quad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\quad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\quad + -1.00 \cdot -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\quad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\quad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\quad + -1.00 \cdot cos(x) \cdot -1.00 \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))) + -1.00 \\
&\quad \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \\
&\quad \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\quad + -1.00 \cdot sin(x) \cdot -1.00 \cdot (-1.00 \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \\
&\quad \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)))) \\
&\quad + cos(x) \cdot -1.00 \cdot (-1.00 \cdot -1.00 \cdot sin(x) \cdot cos(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot \\
&\quad -1.00 \cdot sin(sin(x)) + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + -1.00 \cdot cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + -1.00 \cdot sin(x) \\
&\quad \cdot (-1.00 \cdot sin(x) \cdot -1.00 \cdot sin(sin(x)) + cos(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x))) \\
&\quad + cos(x) \cdot (-1.00 \cdot cos(x) \cdot -1.00 \cdot sin(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \\
&\quad \cdot cos(x) \cdot cos(sin(x)) + -1.00 \cdot sin(x) \cdot -1.00 \cdot cos(x) \cdot cos(sin(x)) + cos(x) \cdot \\
&\quad -1.00 \cdot (-1.00 \cdot sin(x) \cdot cos(sin(x)) + cos(x) \cdot cos(x) \cdot -1.00 \cdot sin(sin(x))))))
\end{aligned}
\tag{3.208}
$$

Taylor Series:

$$T(cos(sin(x)) + x^{3.00}) = 1.00 - 0.50 \cdot x^{2.00} + x^{3.00} + 0.21 \cdot x^{4.00}... \quad (3.209)$$