Auto-generated calculus article

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Abstract

Wonderful article

1 Derivative

Let us find the derivative of the following function:

$$\sin x^3 + (\cos 15 \cdot x)^4 \tag{1}$$

We shall ponder the following:

$$15 \cdot x \tag{2}$$

Clearly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{3}$$

Consider the following:

$$x^3 \tag{4}$$

Obviously, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{5}$$

Now the proof that the derivative of this function is equal to

$$\cos x^3 \cdot 3 \cdot x^{3-1} \cdot 1 + 4 \cdot (\cos 15 \cdot x)^{4-1} \cdot -\sin 15 \cdot x \cdot (0 \cdot x + 15 \cdot 1) \tag{6}$$

shall be considered an amusing exercise for the reader. Unsurprisingly, if we simplify this we wil get

$$\cos x^3 \cdot 3 \cdot x^2 - 4 \cdot (\cos 15 \cdot x)^3 \cdot \sin 15 \cdot x \cdot 15 \tag{7}$$

2 Taylor series

Let us find the Taylor series at $x = 0$ of the following function:

$$\sin x^3 + (\cos 15 \cdot x)^4 \tag{8}$$

The following is worth a closer look:

$$15 \cdot x \tag{9}$$

It is now obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{10}$$

We are going to study the following:

$$x^3 \tag{11}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{12}$$

The object of our ultimate interest is the following:

$$15 \tag{13}$$

Trivially, the derivative of this is equal to

$$0 \tag{14}$$

Consider the following:

$$15 \cdot x \tag{15}$$

Unsurprisingly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{16}$$

We shall ponder the following:

$$15 \cdot x \tag{17}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{18}$$

We are going to study the following:

$$4 \tag{19}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{20}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$x^2 \tag{21}$$

Unsurprisingly, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{22}$$

One shall regard the object in question with utmost interest:

$$3 \tag{23}$$

Clearly, the derivative of this is equal to

$$0 \tag{24}$$

We shall ponder the following:

$$x^3 \tag{25}$$

It can be easily proved, that the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{26}$$

Let us take a look at this:

$$15 \tag{27}$$

Clearly, the derivative of this is equal to

$$0 \tag{28}$$

Let us take a look at this:

$$15 \cdot x \tag{29}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{30}$$

The object of our ultimate interest is the following:

$$15 \tag{31}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{32}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{33}$$

Clearly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{34}$$

One shall regard the object in question with utmost interest:

$$15 \cdot x \tag{35}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{36}$$

Let us take a look at this:

$$3 \tag{37}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{38}$$

We shall ponder the following:

$$4 \tag{39}$$

Clearly, the derivative of this is equal to

$$0 \tag{40}$$

We are going to study the following:

$$15 \tag{41}$$

Clearly, the derivative of this is equal to

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We are going to study the following:

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Trivially, the derivative of this is equal to

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One shall regard the object in question with utmost interest:

$$15 \cdot x \tag{45}$$

Obviously, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{46}$$

The following is worth a closer look:

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It is now obvious, that the derivative of this is equal to

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We will take a closer look at this:

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We are going to study the following:

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Unsurprisingly, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{60}$$

We will take a closer look at this:

$$2 \cdot x \tag{61}$$

As you can see, the derivative of this is equal to

$$0 \cdot x + 2 \cdot 1 \tag{62}$$

The object of our ultimate interest is the following:

$$3 \tag{63}$$

Clearly, the derivative of this is equal to

$$0 \tag{64}$$

We will take a closer look at this:

$$x^3 \tag{65}$$

As you can see, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{66}$$

Consider the following:

$$15 \tag{67}$$

It can be easily proved, that the derivative of this is equal to

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The object of our ultimate interest is the following:

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Unsurprisingly, the derivative of this is equal to

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Consider the following:

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$$0 \tag{82}$$

Let us take a look at this:

$$15 \tag{83}$$

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Let us take a look at this:

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We are going to study the following:

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$$0 \cdot x + 15 \cdot 1 \tag{96}$$

Let us take a look at this:

$$2 \tag{97}$$

Clearly, the derivative of this is equal to

$$0 \tag{98}$$

One shall regard the object in question with utmost interest:

$$3 \tag{99}$$

Trivially, the derivative of this is equal to

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We are going to study the following:

$$15 \tag{101}$$

As you can see, the derivative of this is equal to

$$0 \tag{102}$$

Let us take a look at this:

$$15 \tag{103}$$

As you can see, the derivative of this is equal to

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We will take a closer look at this:

$$15 \cdot x \tag{105}$$

Trivially, the derivative of this is equal to

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We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{107}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{108}$$

We shall ponder the following:

$$3 \tag{109}$$

As you can see, the derivative of this is equal to

$$0 \tag{110}$$

One shall regard the object in question with utmost interest:

$$4 \tag{111}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{112}$$

We will take a closer look at this:

$$15 \tag{113}$$

As you can see, the derivative of this is equal to

$$0 \tag{114}$$

One shall regard the object in question with utmost interest:

$$15 \tag{115}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \tag{116}$$

We shall ponder the following:

$$15 \tag{117}$$

Clearly, the derivative of this is equal to

$$0 \tag{118}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{119}$$

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$$15 \tag{125}$$

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$$0 \tag{126}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

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It is now obvious, that the derivative of this is equal to

$$0 \tag{128}$$

We are going to study the following:

$$15 \cdot x \tag{129}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{130}$$

The following is worth a closer look:

$$15 \tag{131}$$

Obviously, the derivative of this is equal to

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The object of our ultimate interest is the following:

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We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

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It is now obvious, that the derivative of this is equal to

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Let us take a look at this:

$$4 \tag{139}$$

As you can see, the derivative of this is equal to

$$0 \tag{140}$$

One shall regard the object in question with utmost interest:

$$2 \cdot x \tag{141}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 2 \cdot 1 \tag{142}$$

The object of our ultimate interest is the following:

$$3 \tag{143}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{144}$$

The object of our ultimate interest is the following:

$$x^2 \tag{145}$$

As you can see, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{146}$$

The object of our ultimate interest is the following:

$$3 \tag{147}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{148}$$

The object of our ultimate interest is the following:

$$x^3 \tag{149}$$

Clearly, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{150}$$

We will take a closer look at this:

$$x^2 \tag{151}$$

Unsurprisingly, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{152}$$

One shall regard the object in question with utmost interest:

$$3 \tag{153}$$

Trivially, the derivative of this is equal to

$$0 \tag{154}$$

Consider the following:

$$2 \cdot x \tag{155}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 2 \cdot 1 \tag{156}$$

The object of our ultimate interest is the following:

$$3 \tag{157}$$

It can be easily proved, that the derivative of this is equal to

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We shall ponder the following:

$$x^3 \tag{159}$$

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Unsurprisingly, the derivative of this is equal to

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The following is worth a closer look:

$$x^3 \tag{179}$$

Clearly, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{180}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$6 \tag{181}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{182}$$

We shall ponder the following:

$$x^3 \tag{183}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{184}$$

Consider the following:

$$6 \tag{185}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

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We are going to study the following:

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Consider the following:

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One shall regard the object in question with utmost interest:

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The object of our ultimate interest is the following:

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Consider the following:

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It can be easily proved, that the derivative of this is equal to

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Let us take a look at this:

$$x^3 \tag{231}$$

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The object of our ultimate interest is the following:

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It can be easily proved, that the derivative of this is equal to

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The object of our ultimate interest is the following:

$$3 \tag{235}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{236}$$

Consider the following:

$$6 \tag{237}$$

As you can see, the derivative of this is equal to

$$0 \tag{238}$$

The object of our ultimate interest is the following:

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Clearly, the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{240}$$

Let us take a look at this:

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Unsurprisingly, the derivative of this is equal to

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The following is worth a closer look:

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We will take a closer look at this:

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We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

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One shall regard the object in question with utmost interest:

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Consider the following:

$$15 \tag{325}$$

As you can see, the derivative of this is equal to

$$0 \tag{326}$$

We are going to study the following:

$$15 \cdot x \tag{327}$$

It is now obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{328}$$

Let us take a look at this:

$$15 \cdot x \tag{329}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{330}$$

Consider the following:

$$3 \tag{331}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{332}$$

The object of our ultimate interest is the following:

$$4 \tag{333}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{334}$$

The object of our ultimate interest is the following:

$$15 \tag{335}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{336}$$

Consider the following:

$$15 \tag{337}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{338}$$

The following is worth a closer look:

$$15 \cdot x \tag{339}$$

Obviously, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{340}$$

One shall regard the object in question with utmost interest:

$$15 \tag{341}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{342}$$

We will take a closer look at this:

$$15 \cdot x \tag{343}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{344}$$

The object of our ultimate interest is the following:

$$15 \tag{345}$$

Clearly, the derivative of this is equal to

$$0 \tag{346}$$

Let us take a look at this:

$$15 \cdot x \tag{347}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{348}$$

We are going to study the following:

$$15 \cdot x \tag{349}$$

It is now obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{350}$$

We are going to study the following:

$$2 \tag{351}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{352}$$

Let us take a look at this:

$$3 \tag{353}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{354}$$

Let us take a look at this:

$$15 \tag{355}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{356}$$

Consider the following:

$$15 \tag{357}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{358}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{359}$$

Obviously, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{360}$$

The object of our ultimate interest is the following:

$$15 \cdot x \tag{361}$$

Obviously, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{362}$$

Let us take a look at this:

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Clearly, the derivative of this is equal to

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Unsurprisingly, the derivative of this is equal to

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$$0 \tag{368}$$

We are going to study the following:

$$15 \cdot x \tag{369}$$

Clearly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{370}$$

The object of our ultimate interest is the following:

$$15 \tag{371}$$

It can be easily proved, that the derivative of this is equal to

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We will take a closer look at this:

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Consider the following:

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Unsurprisingly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{382}$$

One shall regard the object in question with utmost interest:

$$2 \tag{383}$$

Trivially, the derivative of this is equal to

$$0 \tag{384}$$

We will take a closer look at this:

$$3 \tag{385}$$

It can be easily proved, that the derivative of this is equal to

$$0 \tag{386}$$

We shall ponder the following:

$$15 \tag{387}$$

Trivially, the derivative of this is equal to

$$0 \tag{388}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{389}$$

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$$0 \cdot x + 15 \cdot 1 \tag{390}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \tag{391}$$

As you can see, the derivative of this is equal to

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We will take a closer look at this:

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Let us take a look at this:

$$3 \tag{439}$$

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$$0 \tag{440}$$

The following is worth a closer look:

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Obviously, the derivative of this is equal to

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We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

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Let us take a look at this:

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The object of our ultimate interest is the following:

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Trivially, the derivative of this is equal to

$$0 \tag{498}$$

Consider the following:

$$15 \tag{499}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{500}$$

Consider the following:

$$15 \cdot x \tag{501}$$

As you can see, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{502}$$

The object of our ultimate interest is the following:

$$15 \cdot x \tag{503}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{504}$$

One shall regard the object in question with utmost interest:

$$4 \tag{505}$$

Trivially, the derivative of this is equal to

$$0 \tag{506}$$

The following is worth a closer look:

$$15 \tag{507}$$

Trivially, the derivative of this is equal to

$$0 \tag{508}$$

We shall ponder the following:

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It can be easily proved, that the derivative of this is equal to

$$0 \tag{510}$$

Let us take a look at this:

$$15 \tag{511}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{512}$$

One shall regard the object in question with utmost interest:

$$15 \cdot x \tag{513}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{514}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \tag{515}$$

Trivially, the derivative of this is equal to

$$0 \tag{516}$$

The following is worth a closer look:

$$15 \cdot x \tag{517}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{518}$$

Let us take a look at this:

$$15 \cdot x \tag{519}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{520}$$

The object of our ultimate interest is the following:

$$3 \tag{521}$$

As you can see, the derivative of this is equal to

$$0 \tag{522}$$

Consider the following:

$$4 \tag{523}$$

Trivially, the derivative of this is equal to

$$0 \tag{524}$$

We are going to study the following:

$$15 \tag{525}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \tag{526}$$

We shall ponder the following:

$$15 \tag{527}$$

Clearly, the derivative of this is equal to

$$0 \tag{528}$$

The following is worth a closer look:

$$15 \cdot x \tag{529}$$

Obviously, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{530}$$

We will take a closer look at this:

$$15 \tag{531}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{532}$$

We shall ponder the following:

$$15 \cdot x \tag{533}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{534}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \tag{535}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{536}$$

Consider the following:

$$15 \cdot x \tag{537}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{538}$$

We are going to study the following:

$$15 \cdot x \tag{539}$$

Clearly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{540}$$

The object of our ultimate interest is the following:

$$2 \tag{541}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \tag{542}$$

Let us take a look at this:

$$3 \tag{543}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{544}$$

We shall ponder the following:

$$15 \tag{545}$$

Obviously, the derivative of this is equal to

$$0 \tag{546}$$

We will take a closer look at this:

$$15 \tag{547}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \tag{548}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{549}$$

Clearly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{550}$$

We shall ponder the following:

$$15 \cdot x \tag{551}$$

Trivially, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{552}$$

We shall ponder the following:

$$3 \tag{553}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{554}$$

Consider the following:

$$4 \tag{555}$$

As you can see, the derivative of this is equal to

$$0 \tag{556}$$

Now the proof that the Taylor series of this function at $x = 0$ is equal to

$$A + 6 \cdot \frac{(x-0)^3}{6} + 2.025e+06 \cdot \frac{(x-0)^4}{24} \tag{557}$$

Where:

- $A = 0 + 1 \cdot \frac{(x-0)^0}{1} + 0 \cdot \frac{(x-0)^1}{1} + -900 \cdot \frac{(x-0)^2}{2}$

shall be considered an amusing exercise for the reader. It is now obvious, that if we simplify this we wil get

$$1 - 900 \cdot \frac{x^2}{2} + 6 \cdot \frac{x^3}{6} + 2.025e+06 \cdot \frac{x^4}{24} \tag{558}$$

3 Tangent

Let us find the Taylor series at $x = 0$ of the following function:

$$\sin x^3 + (\cos 15 \cdot x)^4 \tag{559}$$

We are going to study the following:

$$15 \cdot x \tag{560}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{561}$$

We are going to study the following:

$$x^3 \tag{562}$$

It is now obvious, that the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{563}$$

We will take a closer look at this:

$$15 \tag{564}$$

Obviously, the derivative of this is equal to

$$0 \tag{565}$$

We will allow ourselves to divert the reader's attention to this gem of mathematical wonder:

$$15 \cdot x \tag{566}$$

It can be easily proved, that the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{567}$$

We are going to study the following:

$$15 \cdot x \tag{568}$$

Unsurprisingly, the derivative of this is equal to

$$0 \cdot x + 15 \cdot 1 \tag{569}$$

The object of our ultimate interest is the following:

$$4 \tag{570}$$

Trivially, the derivative of this is equal to

$$0 \tag{571}$$

We will take a closer look at this:

$$x^2 \tag{572}$$

Unsurprisingly, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{573}$$

We are going to study the following:

$$3 \tag{574}$$

It is now obvious, that the derivative of this is equal to

$$0 \tag{575}$$

We shall ponder the following:

$$x^3 \tag{576}$$

Any self-respecting mathematician would find it obvious, that the derivative of this is equal to

$$3 \cdot x^{3-1} \cdot 1 \tag{577}$$

Now the proof that the Taylor series of this function at $x = 0$ is equal to

$$0 + 1 \cdot \frac{(x-0)^0}{1} + 0 \cdot \frac{(x-0)^1}{1} \tag{578}$$

is left out for the reader to solve themselves. Any self-respecting mathematician would find it obvious, that if we simplify this we wil get

$$1 \tag{579}$$