Auto-generated calculus article

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Abstract

Wonderful article

1 Derivative

Let us find the derivative of the following function:

$$(x+1)^{\frac{\sin x}{2}} \cdot \left(\arctan\sqrt{x^2+1}\right)^{x-2} \tag{1}$$

One shall regard the object in question with utmost interest:

$$1 \tag{2}$$

Obviously, the derivative of this is equal to

$$0 \tag{3}$$

The object of our ultimate interest is the following:

$$x^2 \tag{4}$$

Trivially, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{5}$$

We are going to study the following:

$$x-2 \tag{6}$$

Unsurprisingly, the derivative of this is equal to

$$1-0 \tag{7}$$

One shall regard the object in question with utmost interest:

$$x+1 \tag{8}$$

Unsurprisingly, the derivative of this is equal to

$$1+0 \tag{9}$$

Let us take a look at this:

$$2 \tag{10}$$

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

$$0 \tag{11}$$

We will take a closer look at this:

$$\sin x \tag{12}$$

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

$$\cos x \cdot 1 \tag{13}$$

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

$$(x+1)^{\frac{\sin x}{2}} \cdot (A) \cdot \left(\arctan\sqrt{x^2+1}\right)^{x-2} + (x+1)^{\frac{\sin x}{2}} \cdot \left(\arctan\sqrt{x^2+1}\right)^{x-2} \cdot (C) \tag{14}$$

Where:

- $A = \frac{\cos x \cdot 1 \cdot 2 - \sin x \cdot 0}{2^2} \cdot \ln(x+1) + \frac{\sin x}{2} \cdot \frac{1+0}{x+1}$
- $B = \frac{1}{1+\left(\sqrt{x^2+1}\right)^2} \cdot \frac{1}{2 \cdot \sqrt{x^2+1}} \cdot \left(2 \cdot x^{2-1} \cdot 1 + 0\right)$
- $C = (1-0) \cdot \ln\arctan\sqrt{x^2+1} + (x-2) \cdot \frac{B}{\arctan\sqrt{x^2+1}}$

has a truly wondrous solution, which is sadly too massive to be shown here. It can be easily proved, that if we simplify this we wil get

$$A \cdot \left(\arctan \sqrt{x^2+1}\right)^{x-2} + (x+1)^{\frac{\sin x}{2}} \cdot C \tag{15}$$

Where:

- $A = (x+1)^{\frac{\sin x}{2}} \cdot \left(\frac{\cos x \cdot 2}{4} \cdot \ln(x+1) + \frac{\sin x}{2} \cdot \frac{1}{x+1}\right)$
- $B = \frac{1}{1+\left(\sqrt{x^2+1}\right)^2} \cdot \frac{1}{2 \cdot \sqrt{x^2+1}} \cdot 2 \cdot x$
- $C = \left(\arctan \sqrt{x^2+1}\right)^{x-2} \cdot \left(\ln \arctan \sqrt{x^2+1} + (x-2) \cdot \frac{B}{\arctan \sqrt{x^2+1}}\right)$

2 Taylor series

Let us find the Taylor series at $x = 5$ of the following function:

$$(x+1)^{\frac{\sin x}{2}} \cdot \left(\arctan \sqrt{x^2+1}\right)^{x-2} \tag{16}$$

One shall regard the object in question with utmost interest:

$$1 \tag{17}$$

Clearly, the derivative of this is equal to

$$0 \tag{18}$$

Let us take a look at this:

$$x^2 \tag{19}$$

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

$$2 \cdot x^{2-1} \cdot 1 \tag{20}$$

We will take a closer look at this:

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

Unsurprisingly, the derivative of this is equal to

$$1 - 0 \tag{22}$$

We shall ponder the following:

$$x + 1 \tag{23}$$

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

$$1 + 0 \tag{24}$$

The object of our ultimate interest is the following:

$$2 \tag{25}$$

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

$$0 \tag{26}$$

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

$$\sin x \tag{27}$$

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

$$\cos x \cdot 1 \tag{28}$$

Consider the following:

$$1 \tag{29}$$

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

$$0 \tag{30}$$

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

$$x^2 \tag{31}$$

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

$$2 \cdot x^{2-1} \cdot 1 \tag{32}$$

One shall regard the object in question with utmost interest:

$$2 \cdot x \tag{33}$$

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

$$0 \cdot x + 2 \cdot 1 \tag{34}$$

Let us take a look at this:

$$1 \tag{35}$$

Clearly, the derivative of this is equal to

$$0 \tag{36}$$

We will take a closer look at this:

$$x^2 \tag{37}$$

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

$$2 \cdot x^{2-1} \cdot 1 \tag{38}$$

Consider the following:

$$2 \tag{39}$$

Trivially, the derivative of this is equal to

$$0 \tag{40}$$

We will take a closer look at this:

$$1 \tag{41}$$

Clearly, the derivative of this is equal to

$$0 \tag{42}$$

The object of our ultimate interest is the following:

$$1 \tag{43}$$

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

$$0 \tag{44}$$

The object of our ultimate interest is the following:

$$x^2 \tag{45}$$

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

$$2 \cdot x^{2-1} \cdot 1 \tag{46}$$

The object of our ultimate interest is the following:

$$1 \tag{47}$$

Trivially, the derivative of this is equal to

$$0 \tag{48}$$

We are going to study the following:

$$1 \tag{49}$$

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

$$0 \tag{50}$$

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

$$x - 2 \tag{51}$$

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

$$1 - 0 \tag{52}$$

Let us take a look at this:

$$1 \tag{53}$$

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

$$0 \tag{54}$$

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

$$x^2 \tag{55}$$

Clearly, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{56}$$

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

$$1 \tag{57}$$

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

$$0 \tag{58}$$

One shall regard the object in question with utmost interest:

$$x^2 \tag{59}$$

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

$$2 \cdot x^{2-1} \cdot 1 \tag{60}$$

One shall regard the object in question with utmost interest:

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

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

$$1 - 0 \tag{62}$$

We will take a closer look at this:

$$x + 1 \tag{63}$$

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

$$1 + 0 \tag{64}$$

Let us take a look at this:

$$2 \tag{65}$$

Unsurprisingly, the derivative of this is equal to

$$0 \tag{66}$$

One shall regard the object in question with utmost interest:

$$\sin x \tag{67}$$

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

$$\cos x \cdot 1 \tag{68}$$

One shall regard the object in question with utmost interest:

$$1 \tag{69}$$

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

$$0 \tag{70}$$

Let us take a look at this:

$$x^2 \tag{71}$$

Obviously, the derivative of this is equal to

$$2 \cdot x^{2-1} \cdot 1 \tag{72}$$

Consider the following:

$$x - 2 \tag{73}$$

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

$$1 - 0 \tag{74}$$

Consider the following:

$$x + 1 \tag{75}$$

Clearly, the derivative of this is equal to

$$1 + 0 \tag{76}$$

We are going to study the following:

$$1 \tag{77}$$

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

$$0 \tag{78}$$

We are going to study the following:

$$2 \tag{79}$$

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

$$0 \tag{80}$$

We shall ponder the following:

$$\sin x \tag{81}$$

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

$$\cos x \cdot 1 \tag{82}$$

The following is worth a closer look:

$$x + 1 \tag{83}$$

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

$$1 + 0 \tag{84}$$

The object of our ultimate interest is the following:

$$4 \tag{85}$$

Trivially, the derivative of this is equal to

$$0 \tag{86}$$

We will take a closer look at this:

$$2 \tag{87}$$

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

$$0 \tag{88}$$

The following is worth a closer look:

$$\cos x \tag{89}$$

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

$$-\sin x \cdot 1 \tag{90}$$

One shall regard the object in question with utmost interest:

$$x + 1 \tag{91}$$

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

$$1 + 0 \tag{92}$$

Let us take a look at this:

$$2 \tag{93}$$

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

$$0 \tag{94}$$

The following is worth a closer look:

$$\sin x \tag{95}$$

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

$$\cos x \cdot 1 \tag{96}$$

Now the proof that the Taylor series of this function at $x = 5$ is equal to

$$0 + 6^{\frac{\sin 5}{2}} \cdot \left(\arctan \sqrt{26}\right)^3 \cdot \frac{(x-5)^0}{1} + \left(B + 6^{\frac{\sin 5}{2}} \cdot \left(\arctan \sqrt{26}\right)^3 \cdot (A)\right) \cdot \frac{(x-5)^1}{1} \tag{97}$$

Where:

- $A = \ln \arctan \sqrt{26} + 3 \cdot \frac{\frac{1}{1+(\sqrt{26})^2} \cdot \frac{1}{2 \cdot \sqrt{26}} \cdot 10}{\arctan \sqrt{26}}$
- $B = 6^{\frac{\sin 5}{2}} \cdot \left(\frac{\cos 5 \cdot 2}{4} \cdot \ln 6 + \frac{\sin 5}{2} \cdot 0.166667\right) \cdot \left(\arctan \sqrt{26}\right)^3$

is too trivial to be shown here. It is now obvious, that if we simplify this we wil get

$$6^{\frac{\sin 5}{2}} \cdot \left(\arctan \sqrt{26}\right)^3 + \left(B + 6^{\frac{\sin 5}{2}} \cdot \left(\arctan \sqrt{26}\right)^3 \cdot (A)\right) \cdot (x - 5) \tag{98}$$

Where:

- $A = \ln \arctan \sqrt{26} + 3 \cdot \frac{\frac{1}{1+(\sqrt{26})^2} \cdot \frac{1}{2 \cdot \sqrt{26}} \cdot 10}{\arctan \sqrt{26}}$
- $B = 6^{\frac{\sin 5}{2}} \cdot \left(\frac{\cos 5 \cdot 2}{4} \cdot \ln 6 + \frac{\sin 5}{2} \cdot 0.166667\right) \cdot \left(\arctan \sqrt{26}\right)^3$