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D I F F E R E N T I A T I O N

Patent pending

1 Abstract

So, scientific works get paid for, right? I've got a master plan... And in case the price is proportional to the word count, here's a little something for you:

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The obvious only consequence of the abovestated is that we need to differentiate the so-called *formula ultima* (by x):

$$\frac{\frac{1}{2} \cdot (\cos(x+y) - \cos(x-y) + 650)}{2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)}}$$

2 The actual work

Let us then begin the differentiation. We shall use the well-known Belyaev's algorithm. Division is troubling, but I guess we have no choice...

$$\frac{d}{dx} \frac{f}{g} = \frac{f' \cdot g - f \cdot g'}{g^2}$$

$$f(x) = \frac{1}{2} \cdot (\cos(x + y) - \cos(x - y) + 650)$$

$$g(x) = 2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)}$$

Exponential differentiation is not as scary as it looks.

$$\frac{d}{dx} a^f = \ln a \cdot a^f \cdot f'$$

$$f(x) = 2$$

$$a = 365 \cdot \ln(\frac{12 \cdot x}{7} + y)$$

Multiplication is a bit difficult, but we can still manage it.

$$\frac{d(f \cdot g)}{dx} = f' \cdot g + f \cdot g'$$

$$f(x) = 365$$

$$g(x) = \ln(\frac{12 \cdot x}{7} + y)$$

Natural logarithm is a beautiful function.

$$\frac{d}{dx} \ln(\frac{12 \cdot x}{7} + y) = \frac{(\frac{12 \cdot x}{7} + y)'}{\frac{12 \cdot x}{7} + y}$$

Thankfully, the derivative is additive.

$$\frac{d}{dx} (\frac{12 \cdot x}{7} + y) = (\frac{12 \cdot x}{7})' + (y)'$$

Any variable other than x may be treated as constant.

$$\frac{d}{dx} y = 0$$

Division is troubling, but I guess we have no choice...

$$\frac{d}{dx} \frac{f}{g} = \frac{f' \cdot g - f \cdot g'}{g^2}$$

$$f(x) = 12 \cdot x$$

$$g(x) = 7$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 7 = 0$$

Multiplication is a bit difficult, but we can still manage it.

$$\frac{d(f \cdot g)}{dx} = f' \cdot g + f \cdot g'$$

$$f(x) = 12$$

$$g(x) = x$$

The derivative of the target variable is obvious.

$$\frac{dx}{dx} = 1$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 12 = 0$$

So, this subexpression results in:

$$0 \cdot x + 12 \cdot 1$$

If we simplify it, we get:

$$12$$

So, this subexpression results in:

$$\frac{12 \cdot 7 - 12 \cdot x \cdot 0}{7^2}$$

If we simplify it, we get:

$$\frac{84}{49}$$

So, this subexpression results in:

$$\frac{84}{49} + 0$$

If we simplify it, we get:

$$\frac{84}{49}$$

So, this subexpression results in:

$$\frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y}$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 365 = 0$$

So, this subexpression results in:

$$0 \cdot \ln\left(\frac{12 \cdot x}{7} + y\right) + 365 \cdot \frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y}$$

If we simplify it, we get:

$$365 \cdot \frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y}$$

So, this subexpression results in:

$$\ln 2 \cdot 2^{365 \cdot \ln\left(\frac{12 \cdot x}{7} + y\right)} \cdot 365 \cdot \frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y}$$

Multiplication is a bit difficult, but we can still manage it.

$$\frac{d(f \cdot g)}{dx} = f' \cdot g + f \cdot g'$$

$$f(x) = \frac{1}{2}$$

$$g(x) = \cos(x + y) - \cos(x - y) + 650$$

Thankfully, the derivative is additive.

$$\frac{d}{dx}(\cos(x + y) - \cos(x - y) + 650) = (\cos(x + y) - \cos(x - y))' + (650)'$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 650 = 0$$

Thankfully, the derivative is additive (even in subtraction).

$$\frac{d}{dx}(\cos(x + y) - \cos(x - y)) = (\cos(x + y))' - (\cos(x - y))'$$

Cosine turns into negative sine.

$$\frac{d}{dx} \cos(x - y) = -\sin(x - y) \cdot (x - y)'$$

Thankfully, the derivative is additive (even in subtraction).

$$\frac{d}{dx}(x - y) = (x)' - (y)'$$

Any variable other than x may be treated as constant.

$$\frac{d}{dx} y = 0$$

The derivative of the target variable is obvious.

$$\frac{dx}{dx} = 1$$

So, this subexpression results in:

$$1 - 0$$

If we simplify it, we get:

$$1$$

So, this subexpression results in:

$$-\sin(x - y) \cdot 1$$

If we simplify it, we get:

$$-\sin(x - y)$$

Cosine turns into negative sine.

$$\frac{d}{dx} \cos(x + y) = -\sin(x + y) \cdot (x + y)'$$

Thankfully, the derivative is additive.

$$\frac{d}{dx}(x + y) = (x)' + (y)'$$

Any variable other than x may be treated as constant.

$$\frac{d}{dx}y = 0$$

The derivative of the target variable is obvious.

$$\frac{dx}{dx} = 1$$

So, this subexpression results in:

$$1 + 0$$

If we simplify it, we get:

$$1$$

So, this subexpression results in:

$$-\sin(x + y) \cdot 1$$

If we simplify it, we get:

$$-\sin(x + y)$$

So, this subexpression results in:

$$-\sin(x + y) - -\sin(x - y)$$

So, this subexpression results in:

$$-\sin(x + y) - -\sin(x - y) + 0$$

If we simplify it, we get:

$$-\sin(x + y) - -\sin(x - y)$$

Division is troubling, but I guess we have no choice...

$$\frac{d}{dx} \frac{f}{g} = \frac{f' \cdot g - f \cdot g'}{g^2}$$

$$f(x) = 1$$

$$g(x) = 2$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 2 = 0$$

Differentiation of a constant is trivial.

$$\frac{d}{dx} 1 = 0$$

So, this subexpression results in:

$$\frac{0 \cdot 2 - 1 \cdot 0}{2^2}$$

If we simplify it, we get:

$$0$$

So, this subexpression results in:

$$0 \cdot (\cos(x + y) - \cos(x - y) + 650) + \frac{1}{2} \cdot (-\sin(x + y) - -\sin(x - y))$$



If we simplify it, we get:

$$\frac{1}{2} \cdot (-\sin(x + y) - -\sin(x - y))$$

So, this subexpression results in:

$$\left(\frac{1}{2} \cdot (-\sin(x + y) - -\sin(x - y)) \cdot 2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)} - \frac{1}{2} \cdot (\cos(x + y) - \cos(x - y) + 650) \cdot \ln 2 \cdot 2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)} \cdot 365 \cdot \frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y} \right) \div \left(2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)} \right)^2$$

3 Conclusion

So yeah, we got the derivative: $(\frac{\frac{1}{2} \cdot (\cos(x+y) - \cos(x-y) + 650)}{2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)}})'(x) = (\frac{1}{2} \cdot (-\sin(x+y) - \sin(x-y)) \cdot 2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)} - \frac{1}{2} \cdot (\cos(x+y) - \cos(x-y) + 650) \cdot \ln 2 \cdot 2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)} \cdot 365 \cdot \frac{\frac{84}{49}}{\frac{12 \cdot x}{7} + y}) \div (2^{365 \cdot \ln(\frac{12 \cdot x}{7} + y)})^2$. The further simplification of the result, if at all possible, is left as an exercise to the reader. Now onto the real business: my payment. **You owe me.** As a wise man once said, ”  *Differentiation is three hundred bucks*  ” ...

4 References

1. Wikipedia. Lots of it. Approx. 40000 BC-2020 AD, I guess...
2. My glorious mind. Pages 371-378. 2002
3. A conspect book of Ilya Dedinsky's seminars, Andrew Belyaev, 2020
4. Jojo references, Dio Brando & many others, 1880-2000 + a couple of universe lifespan cycles
5. Linked list's cross-references (as a source of inspiration), God Almighty himself, exist in a separate concept space outside of the temporal continuum
6. Gachimuchi (in the conclusion), but I was serious: pay me!!!
7. https://github.com/abel1502/mipt_1s, Andrew Belyaev again, 2020