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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...

2 The actual work

Let us, for example, differentiate:

$$x + 7 \cdot \cos y^{x^2}$$

Thankfully, the derivative is additive.

$$\frac{d}{dx} (x + 7 \cdot \cos y^{x^2}) = (x)' + (7 \cdot \cos y^{x^2})'$$

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

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

$$f(x) = 7$$

$$g(x) = \cos y^{x^2}$$

Exponential differentiation is not as scary as it looks.

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

$$f(x) = \cos y$$

$$a = x^2$$

Polynomial differentiation is a piece of cake.

$$\frac{d}{dx} f^a = a \cdot f^{a-1} \cdot f'$$

$$f(x) = x$$

$$a = 2$$

The derivative of the target variable is obvious.

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

So, this subexpression results in:

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

If we simplify it, we get:

$$2 \cdot x$$

So, this subexpression results in:

$$\ln \cos y \cdot \cos y^{x^2} \cdot 2 \cdot x$$

Differentiation of a constant is trivial.

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

So, this subexpression results in:

$$0 \cdot \cos y^{x^2} + 7 \cdot \ln \cos y \cdot \cos y^{x^2} \cdot 2 \cdot x$$

If we simplify it, we get:

$$7 \cdot \ln \cos y \cdot \cos y^{x^2} \cdot 2 \cdot x$$

The derivative of the target variable is obvious.

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

So, this subexpression results in:

$$1 + 7 \cdot \ln \cos y \cdot \cos y^{x^2} \cdot 2 \cdot x$$

3 Conclusion

So yeah, we got the derivative: $\left(x + 7 \cdot \cos y^{x^2}\right)'(x) = 1 + 7 \cdot \ln \cos y \cdot \cos y^{x^2} \cdot 2 \cdot x$. 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* ♂ " ...