What exactly are differentials in calculus?

The correct answer is that differentials are nothing more than **symbolic names** (dy and dx) for parts of the slope of a tangent line (derivative), that is, a ratio of finite differences:

$$\frac{dy}{dx} = \frac{\text{rise}}{\text{run}}$$

In the **New Calculus**, both differentials and derivatives are very well defined. This is not the case in mainstream mathematics. The derivative is defined as follows in the New Calculus:

$$f'(x) = \frac{f(x+n) - f(x-m)}{m+n}$$

Learn more about the new derivative and integral definitions from my New Calculus in my free eBook.

For example, no mainstream source will agree with all the other mainstream sources on the definitions. The most common mainstream understanding (or rather lack thereof) is that the derivative is a rate of change (absolute baloney!) or a ratio of infinitesimals (objects that do not exist in any well-formed fashion). The bordello of mainstream mathematics has invented many wrong theories that include non-standard analysis. The common approach however, is through limits – a very flawed method that is not only circular but also one that assumes many ill-founded beliefs.

Had the so-called "fathers of calculus" known about my historic geometric theorem:

$$\frac{f(x+h)-f(x)}{h} = f'(x) + Q(x,h)$$

The mainstream derivative would have been defined as follows:

$$f'(x) = \frac{f(x+h)-f(x)}{h} - Q(x,h)$$

in which case,

$$f'(x) = \frac{dy}{dx} = \frac{f(x+h)-f(x)-hQ(x,h)}{h}$$

meaning that

$$dy \propto f(x+h) - f(x) - hQ(x,h)$$

and

$$dx \propto h$$

Unfortunately no one was intelligent enough to understand calculus as well as I do. They resorted to gibberish such as rates of change, infinitesimals, etc. In reality, differentials are simply finite differences.

The dismal failure of mainstream academics resulted in the ubiquitous garbage you see published in books and taught in every calculus class:

$$f'(x) = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$$

I debunk this nonsense in several articles but the most well-known is the calculus scam of the last 4 centuries.

Whilst my historic geometric theorem exposes mainstream ignorance and stupidity on a grand scale, the New Calculus is a solid formulation that does not use my historic geometric theorem.

No mainstream academic is brave enough to admit error but it doesn't take a genius like me or even one good at mathematics to realise there is something terribly wrong when claims such as the following are published by very well-known mainstream mathematics academics:

$\frac{dy}{dx}$ must, at least for some considerable time, be regarded as an inseparable whole, just as δx is. It does not in any simple or straight-forward way mean

anything like ‘dy divided by dx’, and a statement such as $\frac{dy}{dx} \times \frac{dx}{dt} = \frac{dy}{dt}$, by cancelling dx’ is just so much gibberish.

Some questions which come to mind are:

Exactly how much time should $\frac{dy}{dx}$ be regarded as an inseparable whole?

If indeed $\frac{dy}{dx}$ is not a fraction or ratio of differentials expressed as numbers, what kind of object can it be?

If the dx are not canceled, then do they magically disappear?

Turns out that the entire paragraph is gibberish! But before the authors (*Hilary Shuard and Hugh Neill in their excellent book on Teaching the Calculus 10 (page 13):*) make this claim, the following comes before it:

The student ... has to learn that, in spite of all the evidence to the contrary, which seems to him to build up from statements such as $\frac{dy}{dx} \times \frac{dx}{dt} = \frac{dy}{dt}$, that $\frac{dy}{dx}$ is not a symbol for a fraction, but for the <u>limit</u> of the gradient of a chord.

A young student asked me about integration by parts. His buffoon calculus lecturer told him that the following is how to derive the method after spending an entire lecture telling him that $\frac{du}{dx}$ is not a fraction:

1. $\frac{d(uv)}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$
2. $u\frac{dv}{dx} = \frac{d(uv)}{dx} - v\frac{du}{dx}$
3. $\int u\frac{dv}{dx}\, dx \ = \int \frac{d(uv)}{dx} - \int v\, \frac{du}{dx}\, dx$
4. $\int u\, dv \ = \ uv - \int v\, du$

If you are a lecturer reading this, then pay attention you moron! $\frac{du}{dx}$ is exactly a fraction. Don't spread bullshit just because you don't know shit about calculus and have never understood the subject. Moreover, you shouldn't even be teaching the subject because chances are you're a clueless, uneducated idiot who can't be fixed. In the New Calculus, differentials and derivatives are well defined. A derivative is precisely a fraction and used as such. Newton and Leibniz did not understand these things, so how could morons like you. Listen to me because I am far more intelligent than the lot of you combined.

For anyone with a modicum of intelligence, it would hurt one's ears to listen to these clowns. The part about ***limit*** is completely debunked in my article which uncovers the misguided beliefs of mainstream math academics.

I am the great John Gabriel, discoverer of the New Calculus, the first rigorous formulation of calculus in human history. More advanced alien civilisations may already know of it. Learn also how I exposed the lie that mainstream calculus was made rigorous.