

# JSH: Key insight, algebra

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What I did was utilize what some might see as a neat trick as first look at

$$f^2((m^3 f^4 - 3m^2 f^2 + 3m) x^3 - 3(-1+mf^2)x u^2 + u^3 f)$$

then multiply through by  $f^2$ , to get

$$(m^3 f^4 - 3m^2 f^2 + 3m)f^2 x^3 - 3(-1+mf^2)x u^2 f^2 + u^3 f^3$$

and you have this neat situation where there's a factor of  $f^2$ , but when you multiply through with it, you can get to something quite different, as using  $y=uf$  on the last two coefficients to get

$$(m^3 f^4 - 3m^2 f^2 + 3m)f^2 x^3 - 3(-1+mf^2)x y + y^3$$

and if you let  $A = (m^3 f^4 - 3m^2 f^2 + 3m)f^2$  and  $B = -1+mf^2$ , you have

$$Ax^3 - 3Bxy + y^3$$

and you don't have a multiple.

The mathematics handles ALL CASES as notice all I've done really is deliberately set  $y$  in one example to  $uf$ , so that I can see how that impacts a factorization.

That doesn't change the fact that  $y$  is an independent variable.

I simply set it to get a multiple— $f^2$ —so that I can figure some things out.

The math can be kind of subtle here, but it's not really that hard.

What can be hard is a will to be wrong on the part of people who fight against the truth against all evidence.

Some of you feel a NEED to be wrong, as your biology compels you to fight for what you were trained to believe even if mathematics says

it's false.

Your GUT INSTINCTS lead you astray, and you forget that you are a biological machine.

You're like religious people.

Before I came along, multiples of polynomials were these trivial things that you just divided off, but I guess maybe another lesson of mathematics is that very little is actually trivial.

If you use a multiple as I have, you can see how factors distribute with roots even if they're irrational, which is a powerful analysis tool.

Now then, I point out that  $m$  and  $f$  are independent of each other so that I can set  $m=0$ , and see what happens with a key factorization when that  $f^2$  multiple is divided off.

For some reason, many of you seem susceptible to the belief that SUDDENLY a multiple of a polynomial must be a variable that varies in how it divides off.

That's not just bizarre; it's not sane.

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