It’s the day after Thanksgiving, so as you read this you are probably eating a leftover turkey sandwich and hoping that there’s still a slice of your favorite pie left when you get back to the fridge. Us, too – having slept off our turkey coma it’s time to make something of the leftovers…namely the problem posted here yesterday about Thanskgiving.

That problem involved what looks on the surface to be a messy, messy algorithm involving fractions and multiple exponents (with variables in them!). But a closer inspection reveals at least a few things to be thankful for – common GMAT-style exponent “tells” that allow you to get to work:

* the bases for the exponents are 2 and 4…and 4 = 2^2, so the bases for all exponents can quickly become 2

* the given value for M is 17 – which in an exponent problem should look helpful to you, as 17 = 16 + 1, or 2^4 + 1. Why is this important? Exponent-based problems that involve addition/subtraction almost always require you to factor common terms. 2^6 + 2^2, for example, becomes 2^2 * (2^4 + 1). Or 4 * 17. Get used to seeing numbers like 17, 31 (which is 2^5 – 1), etc. – prime numbers that don’t seem to have much to go on, when presented in exponent problems, are quite likely to be derived by factoring an add/subtract exponent situation

With the first equation, our goal is to solve for K, the constant in the denominator. We’re given that:

17 = (2^(6+8) + 4^5) / K^10

Where do we go from here? Well, the above assets tell us that we need to factor that addition in the numerator, and that we’ll probably get toward 2^4 + 1 if we do so. So using just the numerator, we have:

2^14 + 4^5

which, if we break 4^5 down into the prime factors of 4, is:

2^14 + 2^10

And if we factor the addition, we have:

2^10 (2^4 + 1) —> Voila! There’s our 17.

17(2^10)

Putting that back into the equation, we have:

17 = 17(2^10)/K^10

The 17s cancel, leaving

1 = (2^10)/(K^10)

So K = 2

If we plug that into the formula for Lauren, we have:

M = (2^16 + 4^7)/2^14

Then prime factor the 4 to get common bases in the numerator:

M = (2^16 + 2^14)/2^14

M = (2^14 * (2^2 + 1))/2^14

The 2^14s cancel, so we have:

M = 2^2 + 1 = 5

What looks like a crazy problem on the surface can become a minor nuisance if you employ the guiding principles for exponent problems:

1) Find common bases, usually through prime factorization

2) Factor addition/subtraction to create multipliation

Exponents-made-easy – isn’t that something to be thankful for?