Solution Guide for Chapter 16

Here are the solutions for the "Doing the Math" exercises in *Kiss My Math*!

DTM from p.258

2. $(\frac{3}{4}x)^4$

Yep, it's just multiplication/division in there, so we can distribute the exponent to everyone inside, like this:

$(\frac{3}{4}x)^4 = \frac{3^4}{4^4}x^4 = \frac{81}{256}x^4$

Notice that we *know* 81 and 256 share no common factors, so we can't reduce this fraction. After all, we know what the prime factorizations are of 81 and 256, and if they have no prime factors in common, they can't have any other factors in common, either!

Prime factorizations:

$81 = 3^4 = 3\times3\times3\times3$

$256 = 4^4 = (2\times2)^4 = 2^4 \times 2^4 = 2^8 = 2\times2\times2\times2\times2\times2\times2\times2$

Nope, no common factors!

Answer: $\mathbf{\frac{81}{256}x^4}$

3. $(\frac{3}{4}x + 5)^4$

There's addition in there, so we *can't distribute* the exponent to anyone inside.

(Just in case you're curious, the only way to deal with this would be to multiply the whole thing out: $(\frac{3}{4}x + 5)\,(\frac{3}{4}x + 5)\,(\frac{3}{4}x + 5)\,(\frac{3}{4}x + 5)$ And you won't learn how to do that until algebra!)

Answer: **can't distribute**

4. $-(\frac{3}{4}xy)^4$ *Hint: Notice that the exponent only affects stuff <u>inside</u> the parentheses!*

Inside the parentheses, there is only multiplication and division, so we're safe to distribute the exponent. Since the exponent can only affect the stuff *inside* the parentheses, that negative sign will still be hanging around after we're done distributing:

$$-(\frac{3}{4}xy)^4 = -\frac{3^4}{4^4}x^4y^4 = -\frac{81}{256}x^4y^4$$

Answer: $\mathbf{-\frac{81}{256}x^4y^4}$

5. $(-\frac{3}{4}x)^4$

Notice that this time, the negative sign is inside the parentheses that the exponent is touching, so the negative sign *will* be affected by the exponent. Since the exponent is even, that means the negative sign will disappear completely! So we can get rid of it now:

$$(-\frac{3}{4}x)^4 = (\frac{3}{4}x)^4$$

And now we can go ahead and distribute the exponent:

$$(\frac{3}{4}x)^4 = = \frac{3^4}{4^4}x^4 = \frac{81}{256}x^4$$

Answer: $\mathbf{\frac{81}{256}x^4}$