

Welcome to Common conversion mistakes and how to avoid them. We have already talked about the use of unit ratios to convert units, but sometimes there are errors in the applications that can trip us up. Luckily these errors are easily avoided uh with a couple of best practices.

The first mistake that I'll sometimes see is that somebody will apply the correct conversion ratio but in inverse of what is needed to actually uh convert the unit. So this mistake is possible when the numeric conversion factor is um is used but then the units are left off or maybe used incorrectly. So for example, if I'm converting a length that's been measured in kilometers. So let's say 578 kilometers and I want to convert this into length in miles, and my conversion factor is going to be 1,600 meters, whoops or 1.6 kilometers is equal to 1 mile. So sometimes I might see an error like this one where somebody will take that 578 kilometers and just multiply by 1.6 and wind up with 924.8 miles. So the best way to avoid mistakes like this one is to write the full conversion factor with units. So when I write it out with the units then I can make sure that my units cancel and that my answer is in the units that I'm looking for. So the sooner you can consistently apply this best practice of using units in your calculations, the better your calculations will become.

The second kind of common conversion mistake that I see happens when we forget basic math rules. So for example let's say I want to convert a volumetric measurement that has been taken in cubic feet. Let's say that I have measured a volume of 25,467 cubic feet and I want to convert this into cubic meters so my conversion factor in this case is going to be 3.28 feet is equal to 1 meter. So sometimes I might see a mistake that people would make that looks like this. So this of course is not correct because the units don't work out right I've got cubic feet here and I've got only feet to the power of one down here that's going to leave me with units of feet squared time meters not meters cubed. So the three-dimensional length or volume requires that this conversion quantity to be cubed so if I write my cube here, let's get rid of this incorrect answer. Now my feet become cubed and my meters become cubed and then my units work out. And then I get a different numeric answer as well.

I'll see another version of this error, for instance if somebody is trying to convert 25 square centimeters into square meters they might write something like this and wind up with an answer of 25 square centimeters is .25 square meters, so that would be wrong. Um so they've recognized that the units have to be squared. Um so the conversion factor here that

we're using of course is 1 meter is equal to 100 centimeters. So if we were converting length in one dimension, that would be our conversion factor. Since we're converting length in two dimensions of course we're squaring here um and so the mistake that was made here was to neglect to square the whole thing. They've squared the units, the meters and the centimeters squared without squaring the quantity right, so this is just for getting a basic math rule. So when a quantity is raised to an exponential value that exponent has to be um applied across every single part. So in actuality my conversion factor is this, I would square the one leaving me with one so my numerator stays the same but I would have to square my 100 too right, so in my denominator my unit quantity would become 10,000 instead of 100, giving me a different answer.

So one final variation of this error is when people apply the conversion factor with the incorrect order of operations. So for that same example where we had the 25 centimeters squared and we want to put this into square meters um I might sometimes see people write everything correctly. So on paper we're good so far but then if I look into the actual operation of what happens they will multiply first 25 times 1, divided by 100, and then square it. So this is incorrect because, according to my correct order of operations, um you guys might know this as PEMDAS, or Please Excuse My Dear Aunt Sally. Um our exponential operations are always done before multiplication. So my correct order of application of operations would be that first I need to quantity square and then I multiply.

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