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SPEAKERS

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Hi everyone, Robert J McKeown here. Welcome back to another video, we're going to pick up where we left off last time, we're going to look at more complicated cases of applying the algebra rules we learned before. We're going to look at algebraic expressions again, this time, we're going to look at them in order to factor them, which is another way of simplifying algebraic expressions. I hope you're ready, because here we go. Previously, we saw a rule that told us that if we have something like A times B plus C within brackets, this is going to be equal to AB, plus AC. Now, here we have a problem where we've got three brackets. Now, one way to solve this is to use BEDMAS. BEDMAS, we're going to do the brackets first, the exponents, then we'll worry about division and multiplication. Notice that each of these is each bracket multiplied by each other. So in the BEDMAS world, we kind of don't have anything to add. Now, if we use BEDMAS, we're going to get five times nine times 13. And that's going to be equal to 45 times 13. And we might want to use a calculator. And if I use a calculator, I get 585, 585.

Now that's the solution using BEDMAS. But let's try it using FOIL. First outside, inside last. Now, if we're going to use FOIL, remember also that there's a rule that says the order of multiplication doesn't matter. So we could multiply two plus three times four plus five, without first multiplying it by six plus seven. So if we just look at this part here, we're going to get eight, that's the two and the four, the two and the five, they're on the outside, so you got plus 10, inside plus 12. And then the last is plus 15. And if we add them up, we get 45. And, of course, the six plus seven bracket never disappeared, we just ignored it. We just ignored it at first. And you can see that the FOIL method would get us the same result. So BEDMAS and FOIL are consistent. And this is going to be important later. In fact, we're going to see rather quickly that it's important, these two things are consistent, because when we're working with unknown variables, when we're working with placeholders, we're not always going to be able to use BEDMAS, we're not going to be able to solve the interior of the bracket before we start doing algebraic operations.

And here's an example of what I mean, we've got A plus B cubed. So we can't, there's no way to simplify A plus B. A plus B cannot be simplified. Can't be simplified. So that BEDMAS approach is not going to get us to a expanded and simplified version of this expression. So if we want to expand this, we're going to expand it we can rewrite it as A plus B, A plus B, A plus B. That's what it means when

it's raised to the exponent of three. And we can just perform this part of the multiplication first. And so we end up also notice that just this part here is one of the important identities that we discussed earlier. So if you memorize it, you know that the answer to this is going to be that.

And we could illustrate the answer. Remember before, what I did was, we could say, well let C be equal to A plus B. And then we'd have A squared plus 2AB, plus B squared, that whole thing times C. And we'd end up with A squared C plus 2ABC, plus B squared C. And then if we replace the C with what it actually is this A plus B, we would get 2A squared A plus B, plus 2AB, A plus B, plus B squared, A plus B, and multiply through using that rule five, remember, this is rule five from an earlier video. We've got oops, I shouldn't have that square there, I should have a cube. A squared times A is A to the power of three plus A squared B plus 2A squared B plus 2AB plus AB squared plus B cubed. And I see we've got a like term here. And we have a like term here. So we can write this as A cubed plus three, A squared B, I'm adding the coefficient in front, plus, I think we have to have a square there looks like another mistake, we've got two, two common terms, two like terms over there. So we're going to add them together. They're also three A B squared. And then we're just left with a one term B cubed.

And so as things get more complicated, we're still relying on those basic algebra rules. In fact, it's that rule five, it's one that says A times B plus C is equal to AB plus AC. That was the rule five that can help us solve something a little more complicated, like this thing up here. So let me start by giving you my definition of what a factor is. So suppose we have a term. And the term is four times six, while the four is a factor, and the six is a factor. And we could say that four and six are factors of 24. So four and six are factors of 24. Now a factoring normally, we will have a number, and we're looking to find its simplest factors. So we often want to express an algebraic expression and its simplest, simplest factors.

So let's consider some examples. So maybe we have 49. If we want to try and illustrate this in its simplest factors, while we know that seven times seven is equal to 49. Seven is simpler than 49. Seven is a prime number. So it's only factors is itself times seven. So we can't get it any simpler than that. We could have a more complicated expression that includes more than one unknown variable. And if we wanted to find the factors of this expression, while two times two is equal to four, and X times X times X is equal to X cubed times Y times Y is equal to Y squared. And so if we wanted to factor this as simply as possible, this is what it might, this is what it would look like. Now let's continue with some numeric examples. So we have 108 divided by 12. Let's factor this, and we'll factor the numerator and we'll factor the denominator together. So looking at 108, we could write it as two times 54. But of course, you could just keep going. So 54 divided by two is going to be equal to 27. 27 is three times three, or three times nine, or three times three times three. And so I think that's as simple as we're going to get for the numerator, the denominator is easier, we could write it as three times four. And then we get three times two times two. And that's as good as it gets. Now we can notice that those will cancel out, or two divided by two is equal to one. And we're left with nine.

Looking at the bottom example, well, the numerator is going to be three times three. So there it is expressed in its simplest factored form. What about the denominator? Well, we know that to get 81, we could take eight times nine. Sorry, that's nine times nine, not eight times nine. And we're going to have three, three up here, well, three times three is equal to nine. And so this is going to be one over

nine. After this video, you now know how to expand a parentheses that have more than two terms. And you learned how to factor, and factoring is going to become very important for our next topic, which is about simplifying algebraic expressions. I hope to see you in our next video. Remember, do the homework practice. It'll stick in your long term memory and will make things a lot easier for you in the future.