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Mon, 11/22 4:11PM 11:17

SUMMARY KEYWORDS

rule, equal, bracket, solve, multiply, notes, threes, multiplication, write, reviewed, undefined, foil, learning, number, algebraic expressions, simple, problem, algebra, bedsheet, answer

SPEAKERS

Robert McKeown

My name is Robert J McKeown and I'm really excited to have you here with me as we go through algebraic expressions, I'm going to show you some of the algebra rules that many of which you know, but there's one in particular that I want to focus on. And I want us to spend some time looking at. So we're going to do that today, for you make sure your mind is on, you're ready to focus. We've got some nice problems to work through together, and we've got some nice embedded questions as well. When I was a student, and I was learning topics that were important that I was going to need later, I always made sure I had a pen and a piece of paper with me, so I could make notes as I went and work along with the professor. For me, making the notes was more important part of learning than even reviewing the notes later. Sometimes I reviewed them later, sometimes I didn't. So please turn your minds on, get ready to work. And here we go.

Let's look at our setup for some algebra rules. We've got four placeholder letters A, B, C, and D. And we're told that A, B and C are real numbers. What's a real number, that means we're talking about something like maybe the square root of two, maybe four over seven, maybe 2.5, something like that. And we have D, which is a positive integer. So it's going to be a whole number, it's going to be something like 1, 77, 88, or something like that. That's our setup. Now we're ready for our first rule, and it's one you probably already know. Yeah, when we're adding, when we're adding the operation is adding, the order does not matter. So if we have, say two plus three, we'll make that zero, that's going to be equal to two plus zero plus three, or three plus two plus zero. So the order of operation doesn't matter. Next rule, you're probably aware of this one as well. The order of multiplication does not matter. If we have two threes, that's like having three two. So the order of multiplication does not matter. Doesn't matter, we have two threes, or we have three twos.

So far, so good, I hope. Our next rule, you're probably aware of this one as well. Any real number multiplied by zero is equal to zero. If we have zero fives, that means we have zero, we have nothing. And if we write zero to the power of four, that's just like zero, times zero, times zero times zero, which is equal to zero. Alright, time for the next rule. Take a look at your screen. What are the words saying we've got those same real numbers and that positive integer. And rule number four says that any real number divided by zero is undefined. What do we mean by undefined? It means that we don't know the answer. So it's unknown. And that means if we've got two divided by zero, we don't know what

that is, we can't prove that it's anything. It's just undefined. Similarly, if we have zero to the power of negative two, that's like one over zero times one over zero, which is not known. It's also going to be undefined.

We're down to our last rule. And this one causes a lot of trouble. It looks very simple. It seems very innocent. It says that if we have A and we multiply A by B plus C in a bracket, you can see right here in the bracket, the result is A B plus A C. Seems simple enough, but it causes students so many problems. And it leads to so many sort of silly mistakes or easily solved mistakes. So I want to spend the rest of the video looking at the implications of this rule, and how it implies a solution to more complicated expressions. This is a simple expression when it gets more complicated, following this rule is more difficult than it seems. So let's start with something relatively simple. We'll take two and we'll multiply two by three plus four. Now you might look at this and say, Oh, well, that's very easy. I'm just going to take two I'm going to multiply by three plus four, and I'm going to get 14. And that's perfectly fine. What might you be using here you might be using something like BEDMAS that you were taught in school, where you start with the bracket and then the exponents. And then division. Oops, there's no way anyone can read that. Let me try that again. Division and multiplication followed by addition and subtraction.

Now if we follow rule five, so right rule five here. Rule five would actually say, well, you don't necessarily need to follow BEDMAS, you could just write this as two times three, plus two times four. And that's going to give you six plus eight, which is equal to 14. Let's look at a little more complicated problem. Suppose we have two plus three, all in brackets, multiplied by four plus five, all in brackets. Now we can use BEDMAS to solve it, that's probably how you're familiar with doing it. So I can solve what's in the brackets first. So we're gonna have five times nine. And that gives us 45. Now let's take a look at rule five. And how can we apply rule five to solve in this problem, we know the answer is going to be 45. So let's apply rule five in such a way that we know we're going to get this right answer 45. And you can kind of see, if we let this whole thing here be A, then we're going to get maybe I could write it like so. We're going to get 4A plus 5A where we've got four times two plus three, plus five, times two plus three. And that is going to be equal to eight plus 12 plus 10, plus 15. And you should be able to see that that's also going to be equal to 45. So rule five is consistent. Consistent with BEDMAS.

And when it comes to rule five, sometimes rule five also has an acronym to go with it, and that acronym is FOIL. And what FOIL is, is it's: first outside, inside last. That's the FOIL rule. And so if I've got two plus three, four plus five, we can take the first so the first is the two and the four. So we get two times four, plus the outside, so the two is the outside, and the five is also the outside. So we get two times five plus the inside, three is the inside, four is the inside. And last and three is the last and the five is the last. So we get plus three times five. And as we've showed before, previously, how we get the same thing that we got here, when I let A be equal to two plus three. So let me show the, show you the answer. This is a geometry question. We've got a bedsheet with a width and a length, and the area is equal to the width times the length. So here, the area of this bedsheet is going to be A plus three times B plus three, which is going to be equal to, why don't we use FOIL, so we're going to do the first so we get A times B. And then we're going to do the outside. So we've got three A, and then we'll do the inside. So we've got three B, and then we'll do the last and the last two are the

threes. So we've got three times three, or I could just write it as nine. And we don't have the numbers for A and B, they're unknown. And maybe we'll learn a little bit later. But we've got no like terms here. So we'll just leave it as it is.