

# 8

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## SUMMARY KEYWORDS

factors, squared, negative, terms,  $3x$ , expand, correct answer, multiply, foil, rule, answer, questions, left, simpler, problem, solve, equal, minus sign, challenging, notice

## SPEAKERS

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For the most part, the questions we saw before required you to know the rule, i.e. memorize the rule and apply the rule correctly. And then look at applying it in a different situations. These next two questions are more challenging in that you're going to have to be a little bit creative if you want to find the answer. So let's go through them together carefully. And you can see how I go about solving them. And then you can use those same techniques when you're trying to solve similar problems.

So let's look at the first question right here. We want to factor it. And so we've been given a hint that it's possible to factor this. So our answer is going to look something like this. Because we know that the first if we think of FOIL in reverse then we know that the first terms that appear the  $X$  and the  $X$  multiplied together is going to give us that  $X$  squared. Now, what about the rest? Well, we've got a 40 here. So what are the different factors in 40? Well, there's one and 40, two and 20, four and 10, five and eight. Now, which of these factors can be multiplied together and give us negative 40, it's got to be negative 40. And when added together, is going to give us negative three. And so each of these here, each on this list, each of these factors will give us, well will give us 40. If we add in a negative sign to one of the one of the factors that will give us negative 40. But which one is going to give us or has the possibility of giving us a negative three. Take a look. Hopefully, you can see that it's this one down here, five and an eight. So if we had say, negative eight times five, that would give us negative 40. And if we take negative eight, and add five, that's going to give us negative three.

So let's try using these two factors, so  $X$  minus eight, and  $X$  plus five. If we, let's expand these two factors to show whether it's actually the right answer that we want over here. So let's expand this using FOIL, we're going to get  $X$  squared. And then we'll do the outside so we get plus  $5X$ . And then let's do the inside, we've got negative  $X$ . And then let's do the last and we have negative 40. If we collect the like terms, we end up with  $X$  squared minus  $3X$  minus 40. And so we know that  $X$  minus eight times  $X$  plus five is the factor of  $X$  squared minus  $3X$  minus 40.

Let's take a look at our next problem. So we've got this thing here. And the first thing we notice looking at it is that well, we can start by factoring out this two, we've got a two, a factor of two in each of the terms so let's remove them. It's simpler to look at but more importantly it's simpler to

each of the terms, so let's remove them. It's simpler to look at, but more importantly, it's simpler to work with. Because now we can rewrite this as  $2X$  something  $X$ . So notice I've left the there's going to be a subtraction and a minus sign here, but we're not sure which sign it's actually going to be. Now let's focus on that last term, the 12. We can factor 12 by multiplying by itself times one, or we could multiply two by six and we also have three times four. Now each of these pairs of factors is going to multiply and give us 12. Which one is going to give us plus  $X$ ? And of course, plus  $X$  is equal to  $1X$ . So, when we look at these factors here, which one is going to have a difference of plus one, and our candidate is three times four. Of course you know we have three, four minus three is equal to one, or three minus four is equal to negative one. Now, since we want plus one, we can pick this one here. And all right, plus four here, and we'll write minus three over there. So it seems like we have the correct answer.

Let's prove it to ourselves by expanding this. And we're just expanding this to show that we have the right answer. We've got two times, and I'm going to use FOIL,  $X$  squared, the first minus  $3X$ . That's the outside plus the inside and by the last which gives us negative 12. We've got two like terms here in the middle. And there we are, we have exactly what we started with. And so we know that and I'll just get rid of those there. We don't need them anymore. And this up here is our correct answer.