

>> The concentration of potassium ion in solution is 75 milliequivalents per liter. Calculate the number of mols of potassium ion in 2.00 liters. Okay. First thing we want to do is write down the information that we've been given. The first piece of information was that the concentration of potassium ion in solution is 75 milliequivalents per liter. The second piece of information they gave us is that we're starting with 2 liters. The question is how many mols of potassium do we have in that 2 liters? So what we want to ask ourselves is, okay, based on the information we have, what else do we know? We know that if we're starting with liters, looking at what we have here we have two units. We have liters and milliequivalents. That means this is a conversion factor and it will convert from liters to milliequivalents. And so my first step will be to take liters and turn it into milliequivalents. But what else do we need? Well, what we need is a way to get from milliequivalents to mols. And we know these two things will help us get there. First off, one mol of potassium ion is the same as 1 equivalent of potassium ion. And the second thing we know is that there are 1,000 milliequivalents in every equivalent. So now using these other two pieces of information we know, we can then look at our plan. We're going to start with liters and go to milliequivalents using this conversion factor. We can then go from milliequivalents to equivalents using this equality to set up a conversion factor. And thirdly, we can go from equivalents to mols using this equation here, this equality, to set up our third conversion factor. So let's go ahead and work our problem. Starting with the 2 liters, we're going to convert to milliequivalents. So here's our conversion factor set up in such a way that we can cancel out liters. And by multiplying 2 times 75 to get us 150, we end up with units of milliequivalents of potassium ion. Okay. Now we're going into step two. Step two takes us from milliequivalents to equivalents. We're using this right here again. So we have our 150 milliequivalents. Using that equality we can set up our conversion factor of 1 equivalent over 1,000 milliequivalents. This enables us to cancel out milliequivalents and our result is .15 equivalents of potassium ion. Okay. Third step, going from equivalents to mols. We're going to now use this here, 1 mol of potassium ion equals 1 equivalent of potassium ion. So we have our .15 equivalent times our ratio of 1mol of potassium to 1 equivalent of potassium. The equivalents will cancel out leaving us with units of mols. And then we have our .15 times the 1 equals .15 mols of potassium ion.