

**TIMSS Video – Hong Kong - <http://timssvideo.com/65>**

Identities (NB10311008)

<b>Time</b>	<b>Caption</b>
<u>00:00:06</u>	Okay, okay. Shh. Stand up please. Good morning class.
<u>00:00:19</u>	Miss Tam, okay,
<u>00:00:23</u>	returned this for you.
<u>00:00:31</u>	Okay, we will start a new chapter today.
<u>00:00:59</u>	On the blackboard, there are two different equations. Okay? Two different equations. It is the equation in X, one unknown only.
<u>00:01:08</u>	Therefore, I think that you are familiar with this.
<u>00:01:13</u>	I want two of you, okay, to come out and find the solution for these two equations. Any? None of you?
<u>00:01:25</u>	[ Laughter ]
<u>00:01:27</u>	I think that you will like to come out today.
<u>00:01:30</u>	Kwan Chi Chung, please. This one. Okay, another beautiful girl, right? Chow Suk Fun.
<u>00:01:39</u>	Yes.
<u>00:01:40</u>	Okay. You try to use what you have learned in equations to find the value for X. Okay?
<u>00:02:16</u>	[ Laughter ]
<u>00:02:20</u>	Some of you laughed, it means that you find some mistakes, which one? Equation one or equation two?
<u>00:02:28</u>	Two.
<u>00:02:29</u>	Two? Yeung Cho Yee. You try to correct this. Equation two you found some mistakes.
<u>00:02:46</u>	Really? [ Laughter ]
<u>00:02:47</u>	[ Laughter ]
<u>00:02:49</u>	Okay, it should not be four X. Two X on the right-hand side, to the left-hand side, it should be minus two X.
<u>00:02:59</u>	Okay? Therefore, left-hand side is zero.
<u>00:03:01</u>	And 10, positive 10 on the left-hand side, right-hand side? Negative 10, okay? Therefore, 10 minus 10, it is zero. Okay, this, too.
<u>00:03:14</u>	For the first one, you found that the solution is X equals two. What does it mean? X equals two.
<u>00:03:24</u>	If I say that X equals two is the solution, what does it mean? What does it mean?

<b>Time</b>	<b>Caption</b>
<u>00:03:37</u>	It means, when X equals two, left-hand side will equal right-hand side. Let's check it.
<u>00:03:49</u>	Okay, when X equals two, what is the left-hand side? It is two X plus four, okay? Two X plus four.
<u>00:03:59</u>	Two, X, plus four, what's the result?
<u>00:04:07</u>	Eight. Eight.
<u>00:04:08</u>	Eight. All right? And for the right-hand side, it is X plus six. X, we found that X equals two.
<u>00:04:25</u>	Therefore, it is eight again. Are they the same?
<u>00:04:29</u>	Yes. Okay? X equals two, then left-hand side right- equals right-hand side. That is the solution for equation one.
<u>00:04:30</u>	Yes.
<u>00:04:39</u>	How about the others? Lau Wai Fung, give me one more number for X, other than two. Any one?
<u>00:04:54</u>	Try to use [ In Chinese ] three [In English].
<u>00:04:55</u>	Three. Okay. Let's substitute X equals three. Okay? In equation one. Another value for X.
<u>00:05:09</u>	The left-hand side, two X plus four. This time, X equals three. What's the value for the left-hand side?
<u>00:05:22</u>	Ten.
<u>00:05:23</u>	You will find that it is 10. But for the right-hand side, X plus six, X plus six.
<u>00:05:34</u>	Nine.
<u>00:05:35</u>	Nine. All right? They are not equal. Therefore, we will not say that X equals three is a solution. The solution is X equals two.
<u>00:05:49</u>	All right? Of course, you can test for the others. Okay, how about equation two, I get zero equals zero, what does it mean?
<u>00:06:01</u>	Do you think that there is no solution? There is no solution. Any one of you say that there is no solution?
<u>00:06:11</u>	I can't find X, therefore, no solution. No? Then what will be the solution?
<u>00:06:18</u>	Anything.
<u>00:06:20</u>	Sorry? Anything. What do you mean by anything?
<u>00:06:24</u>	Any number.
<u>00:06:26</u>	Any number. Okay. Let's check it. We have two and three, okay?
<u>00:06:32</u>	Let's try this two firstly. When X equals two. Left-hand side, right-hand side.

<b>Time</b>	<b>Caption</b>
<u>00:06:47</u>	I try to compare these two when X equals two. Left-hand side is two X plus 10. Two X plus 10. Answer?
<u>00:06:59</u>	Fourteen.
<u>00:07:03</u>	Fourteen. Right-hand side? Two X plus five. Two plus five. It is?
<u>00:07:14</u>	Fourteen.
<u>00:07:15</u>	Fourteen again. Seven times two. Are the two sides equal?
<u>00:07:22</u>	Yes.
<u>00:07:23</u>	Yes. Left-hand side equals right-hand side, therefore, even if I can't find the solution, in fact, two, itself, is one of the solutions.
<u>00:07:32</u>	How about three? When X equals three. Of course, both the left-hand side and right-hand side, the values will be changed. Okay?
<u>00:07:49</u>	On the left-hand side, it is two X plus 10. And on the right-hand side, it is two X plus five. For the left-hand side, it is?
<u>00:08:05</u>	Sixteen.
<u>00:08:06</u>	Sixteen. Six plus 10. But for the right-hand side?
<u>00:08:12</u>	Sixteen.
<u>00:08:13</u>	It is also 16. This time it is two times eight, is it equal?
<u>00:08:19</u>	Yes.
<u>00:08:20</u>	Yes, the left-hand side is still equal to the right-hand side. Not no solution, in fact, at least we have found two. Okay?
<u>00:08:31</u>	More than one. How many? From the book, you still have three trials, try to test whether these three are the solutions or not.
<u>00:08:45</u>	Page one-four-four. Page one-four-four. In fact, the equation listed is the equation two. Okay?
<u>00:08:54</u>	Two X plus 10 equals two brackets, X plus five. Test for the other three solutions of X. Part one, part two and part three.
<u>00:09:04</u>	X equals zero, X equals negative one and also X equals negative one over two. Zero, negative integer and negative fraction.
<u>00:09:15</u>	Test for the left-hand side and right-hand side, okay? Are they equal? Do it now. Just mark it on your book.
<u>00:09:26</u>	And answer the question, whether they are equal or not, for the left-hand side and also the right-hand side.
<u>00:10:09</u>	It's better not to use a calculator, okay? But if you use it, just use it to check the answer.

Time	Caption
	It is simple calculation only.
<u>00:10:44</u>	Errors?
<u>00:11:06</u>	Don't use this, this kind of ball pen, you can't see it clearly.
<u>00:11:15</u>	Have all of you finished? Okay, let's check the result. Page one-four-four. The three values for X. Uh... okay, Mak Pui Ling. You are nine.
<u>00:11:29</u>	Tell me the result, when X equals zero, what will be the left-hand side and right-hand side? Left-hand side?
<u>00:11:36</u>	Equals 10.
<u>00:11:37</u>	Equals 10. How about the right-hand side?
<u>00:11:39</u>	Equals 10.
<u>00:11:40</u>	Then is the left-hand side equal to the right-hand side?
<u>00:11:43</u>	Yes.
<u>00:11:44</u>	Yes. Okay? We have test the third value for X. When X equals zero, it is still left-hand side equals right-hand side.
<u>00:11:54</u>	Okay, how about the fourth trial, when X equals negative one. Sung Wai Ling, okay.
<u>00:12:02</u>	Left-hand side equals eight, right-hand side equals eight.
<u>00:12:06</u>	Therefore, do you think that they are equal?
<u>00:12:08</u>	Yes.
<u>00:12:09</u>	Yes. When X equals negative one, both the left-hand side and right-hand side equal eight. Okay?
<u>00:12:17</u>	Therefore, it is still left-hand side equals right-hand side. How about the fifth trial? This time, Lee Shan.
<u>00:12:28</u>	Left-hand side equals nine, right-hand side equals nine.
<u>00:12:32</u>	Okay. Therefore, equal. This time, when X equals negative one over two. Both the left-hand side and right-hand side, the result is nine. Okay?
<u>00:12:44</u>	Therefore, we have the same result. Left-hand side equals right-hand side. How many solutions now?
<u>00:12:53</u>	Five.
<u>00:12:54</u>	Five. Okay? Two on the blackboard with the three in the book, you have five results. Do you think it is only five?
<u>00:13:03</u>	No.
<u>00:13:04</u>	No. It has many many. Infinitely, many results. Why? Okay, let's use another trial.

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<u>00:13:17</u>	This time, this time, we just simplified these two parts. Okay. Left-hand side and right-hand side.
<u>00:13:31</u>	In the expressions, you have learned two forms. The one, all the terms add or minus together.
<u>00:13:40</u>	It is called? It is called? How do we call them? Add or minus together, it is called?
<u>00:13:56</u>	Expanded form.
<u>00:13:57</u>	Expanded form, okay? Expanded form. You have other ways to express the terms, for example, like that.
<u>00:14:12</u>	This time, the terms are times together. Of course we will, we will not call them terms, we should call them- call them?
<u>00:14:23</u>	Factors. Therefore, this is called? Factorized form, okay?
<u>00:14:38</u>	You may express different expressions in expanded form or factorized form. Now we try to change them, with the same kind of form.
<u>00:14:51</u>	Which form, is more easy for you? Expanded form or factorized form?
<u>00:14:59</u>	Factorized form.
<u>00:15:01</u>	Some say expanded, some say factorized. In fact, if you want to find expanded form, what are you doing? Just multiplication. Okay?
<u>00:15:12</u>	But if you want to find the factorized form, you need to find common factors, or maybe groupings, etcetera. Okay?
<u>00:15:21</u>	Therefore, usually, expanded form will be more common, more usual. Just use multiplication, expand it one by one. Okay?
<u>00:15:33</u>	We'll try to change both sides, to be expanded form and compare. Left-hand side, is it expanded form?
<u>00:15:42</u>	Yes.
<u>00:15:43</u>	It is already expanded form. Two X plus 10.
<u>00:15:48</u>	The left-hand side, it is factorized form.
<u>00:15:57</u>	What will be the expanded form for the right-hand side?
<u>00:15:59</u>	Two X...
<u>00:16:00</u>	It will be?
<u>00:16:01</u>	Two X.
<u>00:16:02</u>	Two X.
<u>00:16:03</u>	Plus 10.
<u>00:16:04</u>	Plus 10. Constant terms, both are the same, ten. X term, the same, two X. Therefore,

Time	Caption
	will they be always the same?
<u>00:16:21</u>	Yes.
<u>00:16:22</u>	Yes. In fact, on both sides, the expressions are exactly the same. Or we say that they are identically the same.
<u>00:16:34</u>	Therefore, no matter what's the value of X, it is- you substitute for X, the changes will be the same.
<u>00:16:41</u>	Therefore, you will get the same value. Okay? You cannot see it very easily because at first, they appear in different forms.
<u>00:16:54</u>	But if you change them to be the same, same form, then you can see that in fact, they are identically the same. All right?
<u>00:17:03</u>	Therefore, not just one solution, you have many many solutions.
<u>00:17:11</u>	For this kind of solution, uh, that's- this kind of equation, we will give them a name.
<u>00:17:24</u>	Identity. Identity means that they are exactly the same. Okay? Follow me. Identity.
<u>00:17:34</u>	Identity.
<u>00:17:35</u>	Identity.
<u>00:17:37</u>	Identity.
<u>00:17:38</u>	Okay? And therefore, for this kind of identity, we will give it a symbol, this time, not just two lines.
<u>00:17:53</u>	We use three lines as a symbol. It means both sides are identically the same.
<u>00:18:03</u>	We say that, two X plus 10, is identically equal two bracket, two, uh- X plus five. Okay? It's identically equal.
<u>00:18:18</u>	They are in fact, exactly the same. Okay? All right, then how to prove identity? Do you think that we try all the values for X?
<u>00:18:34</u>	First try, second try, third try, and then, oh, five trials. Then I can conclude they are identity.
<u>00:18:42</u>	No, because, that maybe the sixth trial- it fails. All right? Therefore, to prove identity, we will use this method.
<u>00:18:57</u>	We will try to change the left-hand side or right-hand side to be expanded form and then compare each term.
<u>00:19:01</u>	When all the terms are the same, then we say that it is an identity.
<u>00:19:10</u>	But if there are some different terms, then we will not say that it is an identity. Then it will be a normal equation only. Okay?
<u>00:19:21</u>	All right, I will give you some examples, who's on duty please clean it.

Time	Caption
<u>00:19:27</u>	Clean the blackboard please.
<u>00:19:36</u>	Can you see the blackboard clearly?
<u>00:19:38</u>	Yes.
<u>00:19:40</u>	Yes?
<u>00:19:58</u>	Just leave the word identity, okay?
<u>00:20:15</u>	Therefore, the difference between identity and equation, equation it may be only one solution, two solutions.
<u>00:20:23</u>	But for identity, you have infinite many solutions.
<u>00:20:28</u>	It will be always true, okay? For any value of X.
<u>00:21:13</u>	Okay here, I have two other equations. Of course, now, they are equations only. Okay? We don't know how many solutions for each one.
<u>00:21:25</u>	Therefore, they are still equations only. I want to prove that, whether these equations are identities or not.
<u>00:21:36</u>	Are they identities? Or are they just equations?
<u>00:21:43</u>	The main steps will be, we try to expand the left-hand side and right-hand side, and then compare the terms. Okay?
<u>00:21:52</u>	If they are, okay, they are expanded form already. No need to simplify it. But if they are not, simplify it one by one.
<u>00:22:01</u>	And then compare the sides. Okay? You can start with the left-hand side or right-hand side. No matter.
<u>00:22:10</u>	Okay? It doesn't matter. Left-hand side... expand it. It should be...
<u>00:22:22</u>	Five X.
<u>00:22:24</u>	Five X.
<u>00:22:25</u>	Minus 15.
<u>00:22:27</u>	Minus 15.
<u>00:22:28</u>	Minus three X.
<u>00:22:31</u>	Minus three X and...
<u>00:22:32</u>	Plus three.
<u>00:22:33</u>	Plus three. Therefore, how many X?
<u>00:22:39</u>	Two X.
<u>00:22:40</u>	Two X only. And the constant term?
<u>00:22:43</u>	Minus 12.

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<u>00:22:45</u>	Minus 12. Okay? Expanded form. Simplify that expanded form. And for the right-hand side, after expansion, it is two X.
<u>00:23:02</u>	Two X. Minus 12.
<u>00:23:07</u>	Are they equal?
<u>00:23:08</u>	Yes.
<u>00:23:14</u>	All right? They are equal. Therefore, do you think that it is an identity? Or an equation?
<u>00:23:21</u>	Identity.
<u>00:23:23</u>	Identity. Therefore, you can write down the result like that. Five X minus three minus three X minus one.
<u>00:23:34</u>	Two X minus six bracket. With this symbol. It's identical to the left- uh, right-hand side.
<u>00:23:47</u>	Okay? Or you can write it as a written form. It is an identity. Okay? But of course it is not so clear, to just write down it is.
<u>00:23:58</u>	Therefore, I think this is better. With the symbol, one, two, three, three lines. Okay, how about the second one?
<u>00:24:18</u>	How about some helper? So Wing Chung. You need to practice some more about your handwriting.
<u>00:24:32</u>	Try to simplify the left-hand side and right-hand side.
<u>00:24:46</u>	How about the bracket? Are you too nervous?
<u>00:24:51</u>	Yes.
<u>00:25:09</u>	He is very careful.
<u>00:25:11</u>	[ Laughter ]
<u>00:25:13</u>	Very very careful. [ Laughter ] How about the right-hand side? Is he correct for the left-hand side?
<u>00:25:26</u>	Yes.
<u>00:25:27</u>	Yes.
<u>00:25:36</u>	Okay, thank you. Firstly, is he correct for the simplification in the left-hand side and right-hand side?
<u>00:25:47</u>	Yes.
<u>00:25:48</u>	Okay. After simplification, you have two expanded forms, are they equal? No.
<u>00:25:58</u>	Although it is the same five X, but one is positive, another is negative. Okay?
<u>00:26:05</u>	Even the 10 is the same, it is not identically equal. But of course now, it is not the same, negative 10, positive 10, okay?

<b>Time</b>	<b>Caption</b>
<u>00:26:14</u>	Therefore, we can say that, the left-hand side is not equal to the right-hand side.
<u>00:26:23</u>	Then can we say that it is an identity?
<u>00:26:25</u>	No.
<u>00:26:26</u>	No. Then your answer, you may just write down. Or you complete this, okay? Uh, write down the whole equation.
<u>00:26:44</u>	We have the conclusion, this equation is not an identity. Okay? If it is not identity, we can still call it an equation. Okay?
<u>00:26:57</u>	It is only an equation, not an identity. If it is an equation, it may be one solution only. Because it is one unknown, one equation.
<u>00:27:08</u>	Therefore, you may find the solution for it. Just one. But for identity, you have, in fact, infinite many solutions. Okay?
<u>00:27:19</u>	It will be satisfied for all the values of X for identities. Understand? Know the difference between identity and equation.
<u>00:27:31</u>	And for identity, in between the two sides, you can use a new symbol with three lines. And we read it as, is identical to.
<u>00:27:43</u>	Or you can say that they are identically equal. Okay? You have some class practices here. Page one-four-seven, page one-four-seven.
<u>00:28:01</u>	Seven equations are given to you. Okay? Seven equations are given to you. Some of them are already in the expanded form.
<u>00:28:10</u>	But some are still in factorized form. Use the method, okay? Use the method listed on the blackboard.
<u>00:28:19</u>	Tell whether they are identities or not. Understand? Try to prove whether they are identities or not.
<u>00:28:29</u>	Number one to number seven. Those simple ones, just write down the answers in the book.
<u>00:28:35</u>	But if you need to simplify it, for that kind of equation, please do your work on your class workbook.
<u>00:28:45</u>	All right? Class practice number one to number seven. Any more questions? Number one to number seven. Please complete that.
<u>00:29:24</u>	If you need to expand it, simplify it, please do it in your classwork book. Don't just write yes or no.
<u>00:29:36</u>	Just in the case, both sides are in expanded form, you can completely-
<u>00:29:41</u>	Uh, you can directly compare it, then you can write down the answer.
<u>00:29:46</u>	But if they are not exactly the same, in different forms, in your classwork, show some

<b>Time</b>	<b>Caption</b>
	steps.
<u>00:29:54</u>	Okay? How to simplify the left-hand side, how to simplify the right-hand side. And then compare the terms. Okay?
<u>00:30:02</u>	Remember, before the conclusion, write down the result. Whether the left-hand side or right-hand side are equal. Okay?
<u>00:30:11</u>	Before your conclusion, you should have the result. Left-hand side equals, or does not equal right-hand side.
<u>00:30:24</u>	(inaudible)
<u>00:30:25</u>	Classwork book.
<u>00:30:40</u>	[ Bell ]
<u>00:30:52</u>	Is there any question? Write down whether it is left-hand side or right-hand side. Okay?
<u>00:31:06</u>	Stop for a while. After the expansion, remember, you must tell whether they are equal-or not. And then your conclusion.
<u>00:31:19</u>	Okay? If the left-hand side equals the right-hand side, then it is an identity.
<u>00:31:25</u>	But if they are not equal. Then this one, or you can simply say that, it is not an identity.
<u>00:31:39</u>	All right? Okay, finish the work at home and we will check it tomorrow. Stand up please.
<u>00:31:50</u>	Bye class.
<u>00:31:55</u>	Yes. And please say thanks to Miss Tam.
<u>00:31:58</u>	[ Laughter ]