

## China Video Transcript

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00:00:00,000 --> 00:00:02,466

Teacher: How many angles are there in a pair of complementary angles?

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00:00:02,467 --> 00:00:03,232

Students: Two angles.

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00:00:03,233 --> 00:00:05,232

Teacher: Two angles. How about supplementary angles?

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00:00:05,233 --> 00:00:07,499

Student: Two angles.

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00:00:07,500 --> 00:00:28,732

Teacher: Also two angles. Good, given that, I'd like to ask you to look at this question and ponder over it carefully.

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00:00:28,733 --> 00:00:57,532

Teacher: Can you see the question clearly?

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00:00:57,533 --> 00:02:41,666

Teacher: Besides your answer, try to tell us how you get that answer.

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00:02:41,667 --> 00:02:47,399

Teacher: Ok, some of you already have figured it out.

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00:02:47,400 --> 00:02:54,132

Student: I find Angle 2 and Angle 3 are supplementary.

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00:02:54,133 --> 00:02:56,599

Teacher: Angle 2 and Angle 3

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00:02:56,600 --> 00:02:57,932

Student: are supplementary.

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00:02:57,933 --> 00:02:58,566

Teacher: are supplementary.

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00:02:58,567 --> 00:03:00,866

Student: Angle 5 and Angle 1 are supplementary, too.

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00:03:00,867 --> 00:03:06,766

Teacher: All right, we have two pairs of supplementary angles here. The first pair are Angle 2 and Angle 3. Then, the second pair are

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00:03:06,767 --> 00:03:08,266

Student: Angle 5 and Angle 1

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00:03:08,267 --> 00:03:10,332

Teacher: Good, Angle 5 and Angle 1

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00:03:10,333 --> 00:03:13,232

Student: The complementary angles are

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00:03:13,233 --> 00:03:16,466

Student: Angle 4 and Angle 1.

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00:03:16,467 --> 00:03:20,432

Teacher: Angle 4 and Angle 1, or we can say Angle 1 and Angle 4.

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00:03:20,433 --> 00:03:21,699

Student: That's it.

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00:03:21,700 --> 00:03:24,132

Teacher: Ok, that's all we found. Does anyone want to explain why they are complementary or supplementary?

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00:03:24,133 --> 00:03:25,932

Teacher: Ok, you go first.

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00:03:25,933 --> 00:03:28,266

Student: I'd like to explain what is complementary.

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00:03:28,267 --> 00:03:45,932

Student: First of all, as we know complementary angles are two angles whose measures add up to 90 degrees. The measure of Angle 1 is equal to 35 degrees, and the measure of Angle 4 is equal to 55 degrees. So the sum of them would be 90 degrees.

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00:03:45,933 --> 00:03:49,966

Teacher: The measure of Angle 4 is equal to 55 degrees. Right.

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00:03:49,967 --> 00:03:54,299

Student: Then 35 degrees plus 55 degrees is equal to 90 degrees.

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00:03:54,300 --> 00:04:00,899

Teacher: Right.

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00:04:00,900 --> 00:04:06,899

Student: So we can say Angle 1 is an angle complementary to Angle 4.

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00:04:06,900 --> 00:04:12,466

Teacher: Angle 1 is an angle complementary to Angle 4. How to represent the relationship with an equation?

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00:04:12,467 --> 00:04:16,632

Student: It would be Angle 1 is equal to 90 degrees minus Angle 4.

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00:04:16,633 --> 00:04:20,166

Teacher: How do you come up with this equation?

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00:04:20,167 --> 00:04:28,332

Student: Uh, because Angle 1 plus Angle 4 is equal to 90 degrees, so Angle 1 is equal to 90 degrees minus Angle 4.

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00:04:28,333 --> 00:04:48,466

Teacher: I got you. But why not use the equation Angle 1 plus Angle 4 is equal to 90 degrees? Do the two equations represent the same thing? If Angle 1 plus Angle 4 is equal to 90 degrees, then Angle 1 is equal to 90 degrees minus Angle 4. Help me out for this. Are they the same thing?

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00:04:48,467 --> 00:04:50,099

Students: Yes, same.

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00:04:50,100 --> 00:04:50,666

Teacher: Give it a shot. How do you think?

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00:04:50,667 --> 00:05:24,199

Student: The textbook says assume Angle  $\alpha$  is an angle complementary to Angle  $\beta$ . If we represent their relationship with an equation, it would be Angle  $\beta$  is equal to 90 degrees minus Angle  $\alpha$ . Similarly, if Angle 1 is equal to 90 degrees minus Angle 4, Angle 1 is an angle complementary to Angle 4. If Angle 1 plus Angle 4 is equal to 90 degrees, then Angle 1 and Angle 4 are complementary.

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00:05:24,200 --> 00:05:39,566

Teacher: Oh, interesting. He think if Angle 1 plus Angle 4 is equal to 90 degrees, they are complementary. If Angle 1 is equal to 90 degrees minus Angle 4, then Angle 1 is an angle complementary to Angle 4. Do you all agree?

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00:05:39,567 --> 00:05:43,932

Teacher: What would you say ?

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00:05:43,933 --> 00:05:51,332

Student: He just said, if Angle 1 plus Angle 4 was equal to 90 degrees, they were complementary.

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00:05:51,333 --> 00:05:58,766

Student: But I think Angle plus Angle 2 is equal to 90 degrees, and Angle is equal to 90 degrees minus Angle 4, are the same. I do not think there is any difference between the two equations.

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00:05:58,767 --> 00:06:07,266

Student: According to the definition of equation, the two equations are the same. We can get the second equation by adding an Angle 4 to the two sides of the first equation at the same time.

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00:06:07,267 --> 00:06:08,199

Teacher: Yes.

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00:06:08,200 --> 00:06:12,732

Student: They are equal in terms of the definition of equation, but they may not be equal in terms of the definition of angle.

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00:06:12,733 --> 00:06:31,232

Teacher: It could be worthwhile to consider the underlying meaning he just pointed out. Isn't it? In terms of quantitative relationship, one equation can be transformed to the other. Ok, now let's move on to the supplementary relationship here.

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00:06:31,233 --> 00:06:36,166

Student: If the sum of two angles' measures is equal to 180 degree, they are supplementary.

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00:06:36,167 --> 00:06:36,999

Teacher: Right.

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00:06:37,000 --> 00:06:54,399

Student: Angle 1 and Angle 3 are supplementary. First, Angle 2 is equal to 115 degrees. Second, Angle 3 is equal to 65 degrees. 115 degrees plus 65 degrees is equal to 180 degrees, so the measure of Angle 2 is equal to 180 degrees minus the measure of Angle 3.

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00:06:54,400 --> 00:07:16,732

Teacher: In other words, the measure of Angle 2 plus the measure of Angle 3 is equal to 180 degrees, so they are supplementary. OK, in this question, could you find two complementary angles that measure the same?

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00:07:16,733 --> 00:07:17,966

Student: Yes.

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00:07:17,967 --> 00:07:20,432

Teacher: You please.

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00:07:20,433 --> 00:07:21,866

Student: Two angles that measure 45 degrees are complementary.

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00:07:21,867 --> 00:07:24,432

Teacher: Yes, their measures are the same.

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00:07:24,433 --> 00:07:26,599

Teacher: Could you find, you guessed it correctly, that is what I am going to ask.

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00:07:26,600 --> 00:07:31,032

Teacher: Could you find two supplementary angles that measure the same?

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00:07:31,033 --> 00:07:32,266

Student: Yes.

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00:07:32,267 --> 00:07:34,366

Student: Two right angles are supplementary.

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00:07:34,367 --> 00:07:40,099

Teacher: Yes, good. Well, can two acute angles be supplementary angles?

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00:07:40,100 --> 00:07:41,732

Student: No.

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00:07:41,733 --> 00:07:44,466

Teacher: Can a pair of supplementary angles are acute angles?

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00:07:44,467 --> 00:08:05,799

Student: No. The sum of the measures of supplementary angles would be 180 degrees. But the measure of an acute angle cannot be larger than 44 degree, oh sorry, 89 degrees. 89 degrees plus 89 degrees is equal to 178 degrees, not 180 degrees.

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00:08:05,800 --> 00:08:08,732

Teacher: Is an angle that measures 89.5 degrees an acute angle?

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00:08:08,733 --> 00:08:13,332

Student: Yes. Even an angle that measures 89.999 degree is still an acute angle.

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00:08:13,333 --> 00:08:19,699

Student: Complementary angles must be two acute angles.

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00:08:19,700 --> 00:08:26,366

Teacher: I did not ask you, but you are right.

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00:08:26,367 --> 00:08:28,599

Student: We can show this with equations.

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00:08:28,600 --> 00:08:29,299

Teacher: OK.

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00:08:29,300 --> 00:08:51,232

Student: As we all know, the measure of an acute angle would be smaller than 90 degrees. As he just said, if there are two equal angles which measures add up to 180 degrees, they must be two right angles. Because the measures of acute angles are always smaller than 90 degrees, the sum of the measures of two acute angles will not be larger than 180 degrees.

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00:08:51,233 --> 00:09:02,766

Teacher: Therefore, if two angles are supplementary, they must be two obtuse angles.

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00:09:02,767 --> 00:09:03,099

Student: That is not correct.

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00:09:03,100 --> 00:09:08,699

Teacher: No? Why?

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00:09:08,700 --> 00:09:16,166

Teacher: I think if two angles are supplementary, they must be two obtuse angles.

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00:09:16,167 --> 00:09:21,166

Student: I think they could be an acute angle and an obtuse angle.

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00:09:21,167 --> 00:09:25,266

Teacher: She says, although they cannot both be acute angles, but they can be one acute angle and one obtuse angle.

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00:09:25,267 --> 00:09:34,432

Student: For example, just like the Angle 1 and Angle 5 in that question. One angle is an acute angle. The other one is an obtuse angle.

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00:09:34,433 --> 00:09:40,432

Teacher: OK. If two angles are supplementary, they must be one acute angle and one obtuse angle.

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00:09:40,433 --> 00:09:43,666

Student: That's still not accurate.

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00:09:43,667 --> 00:09:50,032

Student: You should say, if two angles are supplementary, at least one of them is an acute angle.

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00:09:50,033 --> 00:09:50,766

Other Students : No, at least one angle larger than 90 degrees.

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00:09:50,767 --> 00:09:52,699

Student: Teacher, I know.

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00:09:52,700 --> 00:09:53,899

Teacher: You please.

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00:09:53,900 --> 00:09:56,632

Student: An exception is the two angles are right angles.

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00:09:56,633 --> 00:10:04,632

Teacher: The two angles can be two right angles, right? Let's move on. If the sum of the measures of Angle 1, Angle 2 and Angle 3 is 180 degrees, can we say the three angles are supplementary?

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00:10:04,633 --> 00:10:09,032

Student: No.

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00:10:09,033 --> 00:10:12,632

Student: Supplementary means a relationship between only two angles.

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00:10:12,633 --> 00:10:41,132

Teacher: Right, two angles. Isn't it? This is the first set of questions for today. Let's move on to the next set. If I have an Angle called CAB like this, oh let's talk about this later.

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00:10:41,133 --> 00:13:31,432

Teacher: Now I'd like you to read the question and apply what you just learned to draw angles as required.

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00:13:31,433 --> 00:13:47,699

Teacher: Some of you have finished the question. How about others? OK. Who wants to go first? How do you think about this question?

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00:13:47,700 --> 00:13:50,066

Student: You please.

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00:13:50,067 --> 00:13:52,833

Teacher: Please bring your worksheet to the board. /END/