Description: Clip 1 of 7: Revisiting Earlier Ideas about the Square of the Quantity (a + b) **Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Three of Seven** **Date: 1996-02-07** **Location: Harding Elementary School** **Researcher: Professor Carolyn Maher**	**Transcriber(s): Aboelnaga, Eman** **Verifier(s): Yedman, Madeline** **Date Transcribed: Fall 2010** **Page: 1 of 3**

Time	Line	Speaker	Transcript
0:00	1	R1	Okay. What I'm going to ask you to do is tell me what you did.
	2	Stephanie	Alright. Well –
	3	R1	You can go through this with me.
	4	Stephanie	'Cause like I didn't know what you wanted, so I basically – it just says like what we did – like in the papers.
	5	R1	You want me to …[*R1reads from the paper.*] "The problem *a* plus *b* quantity squared is the problem I have worked on the last two times. Rutgers" [*pause*]
	6	Stephanie	(inaudible) Oh. My handwriting's a little sloppy.
	7	R1	"My first answer" – It's better than mine. – "My first answer was very simply to distribute the square. *a* squared plus *b* squared was proved wrong, though, when I was asked to use numbers in place of variables – two plus three quantity squared to test two squared plus three squared." You got twenty-five and thirteen –
	8	Stephanie	Um hm.
	9	R1	They're not the same.
	10	Stephanie	Yeah.
	11	R1	You know what we sometimes do? This might be helpful to you. You have two plus three quantity squared – you can put a question mark – does it equal two squared plus three squared? [*R1 writes (* $(2+3)^2 = 2^2 + 3^2$ *with a ? on top of the =.*]
	12	Stephanie	Okay?
	13	R1	Do you see what I'm doing here?
	14	Stephanie	Um hm.
	15	R1	And so what you do next, then you have five squared. You still don't know yet, right? Does it equal
	16	Stephanie	Um hm.
	17	R1	four plus nine. Now you have twenty-five and thirteen and now [*R1 writes* $5^2 = 4 + 9, \quad 25 \neq 13$]
	18	Stephanie	Not equal.
	19	R1	you can say 'not equal'. So that might help you with notation a little bit.
	20	Stephanie	Okay.

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Time	Line	Speaker	Transcript
	21	R1	Okay.
	22	Stephanie	(inaudible)
	23	R1	(inaudible) answer.
	24	Stephanie	'Cause it's really hard to
	25	R1	Why don't you read?
	26	Stephanie	"Disregarding that answer I was asked what *a* plus *b* quantity squared really meant. My answer was easy. *a* plus *b* quantity squared equals *a* plus *b* times *a* plus *b*. Then for a moment, we got slightly off the subject. I was asked the question 'Of any circumstance when *a* plus *b* quantity squared equals *a* squared plus *b* squared'. I said "Yes, there was one circumstance. When *a* equals *b* equals zero, then *a* plus *b* quantity squared equals *a* squared plus *b* squared. With this question answered, we came back to the original problem of *a* plus *b* quantity squared. Now a new concept was brought into the picture. I was asked if I could explain and display *a* squared on a square. I was so dumbfounded. I really had no idea how to show them. Many squares were drawn. The subject of area was discussed. The area of a square is length times width or *a* squared. Still this didn't help me. Around this time we started to discuss the difference between a unit and a square unit. This is a unit in length." This is a unit, or this is a unit, or this – you know? [*Stephanie points to different parts on the paper.*]
	27	R1	Okay.
	28	Stephanie	And this is a square unit, you know?
	29	R1	Okay.
	30	Stephanie	"Next we talked about a square having – wait – we talked about a square with each side equaling *a* plus *b*. After a failed attempt at drawing the square, we came up with this-" [*Stephanie looks for the picture she drew.*] You know, the *a* plus *b*, which was, I don't know, one of these papers. [*continues shuffling the papers on the table*] This one?
	31	R1	Okay.

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	32	Stephanie	And then [*shuffles more of the paper*] Oh. I must've – Okay. [*Stephanie returns to reading her summary of the last session.*] "So we found out that *a* plus *b* times *a* plus *b* equaled *a* plus *b* quantity squared equals *a* plus *aa* plus *ab* plus *bb* plus *aa* which also equals *a* squared plus *ab* plus *ab* plus *b* squared, which equals *a* squared plus *2ab* squared plus *b* squared.
	33	R1	*2ab*
	34	Stephanie	Yeah. "Which like went down to *a* plus *b* quantity squared equals *a* squared plus *2ab* plus *b* squared. And then we tested it. After conducting this and concluding that it worked, we decided that I should try and explain why one unit by one unit equaled one square unit by having Dr. Alston draw a picture of a square without having me see it. And then we did the same thing with a rectangle."
	35	R1	Um hm.
	36	Stephanie	And that was
	37	R1	Where we left off.
	38	Stephanie	basically what we did.
	39	R1	Okay. Does that make sense?
	40	Stephanie	Yeah. I understand what we did. But it's still – I'd probably like take a minute to try to explain it again. Like if I had to explain like the whole thing, it'd probably take me a minute once we got down to like explaining the square-
	41	R1	Um hm.
	42	Stephanie	-like if I had to explain a square again, I'd be (inaudible)
	43	R1	That's the hard part?
	44	Stephanie	Well – 'cause you don't know what the person's drawing. So I could be like 'Draw a line' and they could be like – you know?
	45	R1	Slanting?
	46	Stephanie	So I'd – it's really easier if you can see what you're doing.
	47	R1	Um hm. Right. I think so. Neat! Um. Okay. Um. Just to – that's actually very nice, Stephanie. That's a very lovely write up. Um. How about – you have a younger sister? Susie?