

DEBBIE BORDA: O.K. So Ms. Villarín and I have another problem for you today for number talk and we're really interested in knowing how you're going to solve this one. We're really curious about the strategies that you might use. We're going to start like we've done in the past, where the first time we look at it, we're just going to think about "What's the story? What's happening in the problem? How is it the same as other problems we've been doing? How might it be a little bit different than what we've been doing? What are we trying to figure out?" We're not trying to solve it yet, we're just trying to make sense of what we're being asked to do. O.K.? And remember when I put the (unintelligible) up that that means we're doing quiet think time. Alright? So today's problem is "Vinay bought her new iPod at forty percent off the original price and paid fifty-four dollars. How much money did she save?" Quiet think time. "What are we being asked to do? How is it the same? How is it different from other problems that we've done in the past?" Just think time. I have to say that that's the most seriously you've ever took in think time. O.K. For just a minute, you're going turn and talk to your shoulder partner about your ideas around the problem and "What we're being asked to do and how might it connect to other problems?" We're still not solving it yet. And I'm going to ask the person you're sitting next to who has the longest hair share first.

STUDENT: You have to work backwards to find how much the forty percent is.

STUDENT: Yeah. It's like the same thing as the other ones because this time there's only one percent and the ones before there are two. And for both of the questions we had to work backwards.

STUDENT: How do you find the original price?

STUDENT: We're not finding the original price. We're finding how much we're saving.

STUDENT: Oh yeah huh. But we have to find the original price first before we can find out how much we save.

STUDENT: How do you think we're supposed to get the original price?

STUDENT: I don't know. Do something before you do something. Hi camera!

STUDENT: Do you have to multiply?

STUDENT: I guess. Think of something. You can use the guess and check work.

STUDENT: Yeah, we can do the guess and check.

DEBBIE BORDA: How is that different from the one we did earlier this week with the eighteen dollars and Michelle and Ashley?

STUDENT: They had twenty-five percent off but then she had another twenty-five percent off the others.

DEBBIE BORDA: O.K. So how is this one different from that?

STUDENT: It's forty percent off (inaudible).

DEBBIE BORDA: Nice job. I also hear some people started to think about "Now, how am I going to solve the problem?" So now that's what we're going to do next. So we're going to take a few minutes to mentally solve the problem and we're going to really try not to write in the air and write on our desk. We're going to try doing it here. O.K.? I know it's going to be really hard. And remember that when you have a solution and a strategy, you're going to show Ms. Villarín and me by putting your thumbs up. Or if you've gone as far as you can by yourself and you're ready to talk to a partner, then you're going to put your thumbs up. O.K.? So whenever you're ready to talk, that's when you're going to show us your thumb. If you have a solution and you're still waiting for others to respond with their thumb, then keep trying to find another strategy. Quiet think time. Let's see how we do in solving the problem. Remember that your thumb tells us you're ready to talk. You either have a solution or you have to talk to a partner to come up with one because you have gone as far as you can.

ANTOINETTE VILLARIN: When you're ready to talk, put your thumb by your heart.

DEBBIE BORDA: It's time we're going to turn and talk to our partner and we're going to share two things: our solution and our strategy when you're ready.

STUDENT: Are you guys just subtracting?

STUDENT: Sixty divided by three is twenty percent. Fifty-four divided by three is eighteen. Eighteen times 2 is thirty-six. Fifty-four plus thirty-six...

STUDENT: So do you want me to share or you want to share? Because I just find fifty-four dollars is forty percent. How did you get twenty-one dollars and sixty cents?

STUDENT: I multiplied fifty-four by forty percent.

STUDENT: ...fifty-four dollars.

STUDENT: Times point four is thirty-six though.

STUDENT: But the total is fifty-four dollars.

STUDENT: Ninety subtracted by thirty-six dollars.

STUDENT: Oh I see.

DEBBIE BORDA: If sixty-five was two dollars then what do you think might be a reasonable guess for your next guess?

STUDENT: Eighty.

DEBBIE BORDA: Eighty? Are you going with eighty Jackie? So now take me through your process with eighty.

STUDENT: I found eight percent, I mean ten percent and that's eight dollars then times it by four and I got thirty-two. Thirty-two minus eighty equals...

DEBBIE BORDA: What's wrong with it Michelle? Do you agree? So what would eighty...

STUDENT: Eighty minus thirty-two equals fifty-six. Oh wait.

DEBBIE BORDA: Forty-eight. So are you closer or further away?

STUDENT: Closer.

DEBBIE BORDA: O.K. your first guess gave you what? You said thirty-six dollars? And this one you got forty-eight, is that right? So do you need to go up or down?

STUDENT: Up.

DEBBIE BORDA: Up.

STUDENT: One hundred twenty?

DEBBIE BORDA: One hundred twenty? Do you need to go up really far? O.K. So try one hundred twenty and see what happens.

STUDENT: O.K. so there's no price in forty percent off. Forty percent off there's no price of fifty-four. That means fifty-four is sixty percent. Sixty percent to get it to twenty, you have to divide it by three. So three divided by fifty-four is eighteen. Eighteen times two is thirty-six. So it should say thirty-six dollars. Thirty-six plus fifty-four is ninety.

STUDENT: Yeah.

STUDENT: What's your answer?

STUDENT: I got ninety dollars.

STUDENT: Ninety dollars times point four equals thirty-six and ninety minus thirty-six equals fifty-four dollars.

STUDENT: ...percent of ninety is thirty-six. Ninety minus thirty-six is fifty-four. So you saved thirty-six dollars. I guessed and checked by fives and started at eighty and started coming up. And then when I went to ninety I found forty percent of ninety which is thirty-six. Then ninety minus thirty-six is fifty-four dollars. So she saved thirty-six dollars.

STUDENT: I used the same strategy finding percents because if I multiply decimals in my head I get really confused. That's the truth!

STUDENT: I used the same strategy but I multiplied the decimals.

STUDENT: So I tried to use forty percent. I chopped it off into twenty percent. Twenty percent is eighteen and eighteen is just twenty percent.

STUDENT: So you have to multiply it by two to get...

STUDENT: Yeah, to get thirty-six dollars. And Vinay saved thirty-six dollars.

STUDENT: I still don't get how you got one point five? So the forty percent you chopped it into twenty percent and that would equal what? One point five for each?

STUDENT: No. One point five and point five.

STUDENT: One point five times...

STUDENT: The point five is the twenty percent and one point five is the forty percent. Forty percent is one point five.

STUDENT: So if you multiply one point five times two you get to three.

STUDENT: Yeah.

STUDENT: So fifty-four divided by three equals eighteen. And eighteen is forty percent so you have to multiply two to get forty percent and get thirty-six.

STUDENT: The original price is ninety dollars.

STUDENT: And how did you get that?

STUDENT: Fifty-four add thirty-six dollars.

STUDENT: Fifty-four plus thirty-six?

STUDENT: Yeah because fifty-four is the sales price.

STUDENT: Are they asking for the original price or how much she saved?

STUDENT: Yeah. So is thirty-six.

STUDENT: So they're also asking for the original price and how much she saved?

STUDENT: Just how much she saved. It's thirty-six.

STUDENT: O.K. First you needed to find...he knew that fifty-four percent was sixty percent because sixty plus forty equals a hundred as a whole. So I think he divided fifty-four by three to equal eighteen because he knew that eighteen was twenty percent. So he needed forty percent and he just multiplied it by two to get thirty-six. So that's how much she saved.

ANTOINETTE VILLARIN: O.K. very nice. Normally of course, we'd give you more time but because it's a short period today we're going to kind of move this along. If we don't finish we'll continue tomorrow when I see you guys tomorrow. O.K.? So we heard really good strategies. We heard many different answers. So what Ms. Borda and I would like to do is just get a list of all the different answers we have in the class. So would anyone be willing to share their answer? You don't have to share how you solved it just yet. O.K. Austin?

STUDENT: Thirty-six.

ANTOINETTE VILLARIN: Thirty-six dollars. O.K. Anyone else? Everyone here got thirty-six dollars? Are you sure because I did hear a couple of different answers? I heard twenty-one sixty. Yeah, twenty-one sixty came up quite a bit as I was walking around. Any other ones? No? O.K. So we're now going to share out in our number talk some of the things that you've talked about with your partners. Because of time purposes we're going to call on a few of the students that we heard strategies from and we ask if you could share it. So could we start with Julia and Victor? Can you guys share how you solved it?

STUDENT: So forty percent off the original price is fifty-four. That means fifty-four is sixty percent.

ANTOINETTE VILLARIN: O.K. why is fifty-four sixty percent? How did you get that?

STUDENT: Because forty percent off the original is fifty-four.

ANTOINETTE VILLARIN: O.K. and you're able to present what you consider the original?

STUDENT: A hundred.

ANTOINETTE VILLARIN: A hundred. So to get sixty percent what did you do?

STUDENT: A hundred percent minus forty percent.

ANTOINETTE VILLARIN: O.K. A hundred percent minus forty percent. So for Victor and Julia, this is a strategy that you came up with together?

STUDENT: No.

ANTOINETTE VILLARIN: No? O.K. Did you talk about this one? O.K. so fifty-four dollars represent sixty percent. What did you do second?

STUDENT: I tried to find twenty percent by dividing fifty-four by three.

ANTOINETTE VILLARIN: O.K. you tried to find twenty percent by dividing fifty-four by three. Why did you do that? Why did you divide it by three?

STUDENT: So I could find twenty percent.

ANTOINETTE VILLARIN: O.K. well how does that give you twenty percent?

STUDENT: There are three twenty percents in sixty.

ANTOINETTE VILLARIN: Nice. So there are three twenty percents in sixty. So Victor and Julia decided to take fifty-four and divide it by three. Is Ms. Borda recording it correctly of your thinking? O.K. So what did you get with fifty-four divided by three?

STUDENT: Eighteen.

ANTOINETTE VILLARIN: Eighteen. And what does eighteen dollars represent?

STUDENT: Twenty percent.

ANTOINETTE VILLARIN: Twenty percent. And what did you do next?

STUDENT: Eighteen plus eighteen to make forty percent.

ANTOINETTE VILLARIN: Eighteen plus eighteen to make forty percent. Because eighteen was twenty percent and you were adding another twenty percent to it? O.K. and what did you get for that?

STUDENT: Thirty-six.

ANTOINETTE VILLARIN: So that's how much Vinay saved when she bought her iPod? She saved thirty-six dollars with forty percent? How many of you solved it in a similar way? Since it looked like several of you used a different strategy, we're going to keep this up on the board. We want you to talk about it with your partner and try to make sense of the strategy that Victor and Julia used. So even if you solved it the same way, we'd like you to go step by step and try to make sense of what it means to do each of those steps that Victor and Julia did. Does everybody understand that? O.K. go for it.

STUDENT: Victor got thirty-six dollars by getting forty percent off of fifty-four dollars and then...I don't know how he has sixty percent, I forgot.

STUDENT: Forty percent...one hundred minus forty is sixty so he got sixty percent.

STUDENT: And then to find twenty percent he divided fifty-four out of three.

STUDENT: To get twenty percent (inaudible).

STUDENT: Eighteen...thirty-six dollars.

ANTOINETTE VILLARIN: We're now going to ask for Que and Carl to share their strategy.

STUDENT: We did it the same thing.

ANTOINETTE VILLARIN: Oh, you guys solved it exactly the same way? So you guys were also finding twenty percent? O.K. and did you visualize this model as well? O.K. Alright we're sorry. Did anyone solve it in a different way then? We're so shy today huh? We actually listed some names down. O.K. Roger and Austin.

STUDENT: We used the guess and check.

ANTOINETTE VILLARIN: You used the guess and check strategy. O.K. Can you explain that?

STUDENT: We started with a hundred dollars.

ANTOINETTE VILLARIN: A hundred dollars as you guess for what?

STUDENT: As the guess for the original price.

ANTOINETTE VILLARIN: The original price. So you knew that you had to figure out the original price. Do you guys agree with that?

STUDENTS: Yes.

ANTOINETTE VILLARIN: O.K. So then what did you do next?

STUDENT: We multiplied a hundred by point four.

ANTOINETTE VILLARIN: By point four. And why did you do that?

STUDENT: To find forty percent off.

ANTOINETTE VILLARIN: O.K. to find forty percent off of a hundred. And what did you get for that?

STUDENT: We got forty dollars.

ANTOINETTE VILLARIN: Forty dollars O.K. And then what did you do next?

STUDENT: And then subtract a hundred by forty.

ANTOINETTE VILLARIN: A hundred minus forty. And you got?

STUDENT: Sixty.

ANTOINETTE VILLARIN: Sixty. And what did that sixty tell you?

STUDENT: It was too high?

ANTOINETTE VILLARIN: It was too high. What number were you trying to get?

STUDENT: Fifty-four.

ANTOINETTE VILLARIN: You're trying to get fifty-four as your check? Why fifty-four as your check?

STUDENT: Because that's the price that Vinay paid.

ANTOINETTE VILLARIN: That's the price that Vinay paid. So we know a hundred is too high. So what did you guys do next Roger? You and Roger right? So what did you and Roger do? What was your next guess?

STUDENT: Our next guess was ninety. And then we multiplied ninety by point four.

DEBBIE BORDA: And how did you do that in your head Roger and Austin?

STUDENT: Ninety times four.

DEBBIE BORDA: You did ninety times four.



STUDENT: And then after put the decimals.

DEBBIE BORDA: O.K. What did you get with ninety times four?

STUDENT: Thirty-six.

STUDENT: Thirty-six.

ANTOINETTE VILLARIN: And then what did you do with that thirty-six?

STUDENT: Subtracted ninety by thirty-six.

ANTOINETTE VILLARIN: Ninety minus thirty-six. And you got?

STUDENT: Fifty-four.

ANTOINETTE VILLARIN: Fifty-four. And that matches the check that you wanted to get?

STUDENT: Yes.

ANTOINETTE VILLARIN: So how do you know which is the price that showed how much she saved?

STUDENT: Thirty-six dollars.

ANTOINETTE VILLARIN: Thirty-six dollars. Why is it thirty-six dollars?

STUDENT: Because that's the difference between the original price and the price she paid.

ANTOINETTE VILLARIN: Very nice. That's the difference between the original price of ninety and the price that she paid of fifty-four. I think what we're going to do tomorrow in this class is to continue for tomorrow. We do want to do one quick thing before you guys leave. So we're going to put up the distracter questions, you know the ones we've been doing with the number talks. And if we put it here can everyone see it? Yeah? O.K. And what we want you to do is to pick one of these and try to figure out how somebody might get that answer. What math might they do to get one of the distracter choices?

DEBBIE BORDA: It's not working.

ANTOINETTE VILLARIN: Oh it's not working. Can you guys see? You're going to pick one of the incorrect answers and explain just with your partner, how a student may have gotten that answer.

DEBBIE BORDA: Can you see that incorrect

answer? STUDENT: Yeah.

DEBBIE BORDA: Which also may include a possible answer.

ANTOINETTE VILLARIN: So think about that. We will continue tomorrow. We have time

now? DEBBIE BORDA: Before you go just turn to your partner and say which answer you

picked to

talk about as being incorrect and where your thinking is so far. You may not have come to a solution but what is your thinking so far.