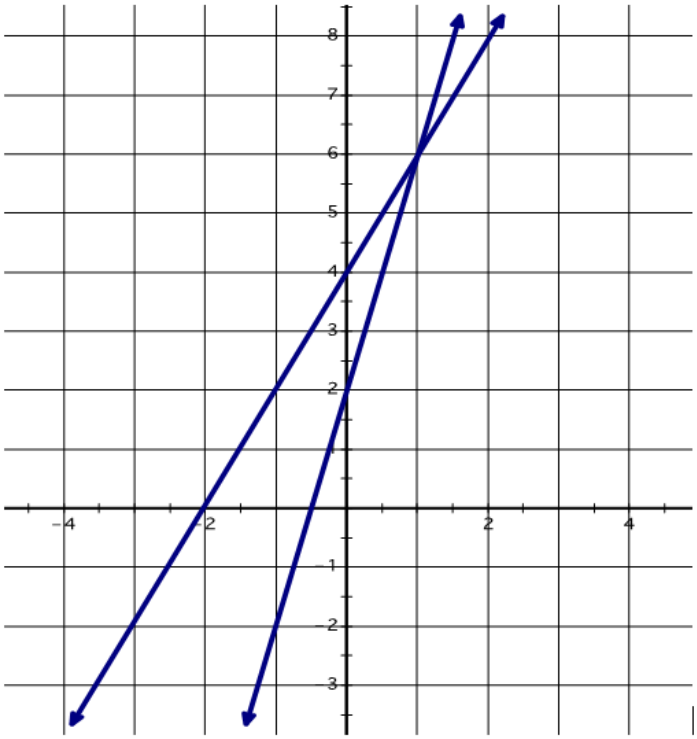
The teacher asks two students to solve for x given $4x + 2 = 2x + 4$.

One solved it graphically, and the other solved it symbolically. How are the solutions related?



$$4x + 2 = 2x + 4$$

$$4x = 2x + 2$$

$$2x = 2$$

$$x = 1$$

Source: Nolan, Dixon, Safi, & Haciomeroglu, 2016, p. 53.

Figure 4.3 Algebraic and Graphical Solutions to Equations Task (Boston, Candela, & Dixon, 2019, p. 84).

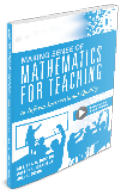
IQA Teacher's Linking Rubric	
4	The teacher consistently (at least 3 times) explicitly connects (or provides opportunities for students to connect) speakers' contributions to each other *and* describes (or provides opportunities for students to describe) how ideas or positions shared during the discussion relate to each other.
3	At least twice during the lesson, the teacher explicitly connects (or provides opportunities for students to connect) speakers' contributions to each other *and* describes (or provides opportunities for students to describe) how ideas or positions relate to each other.
2	At one or more points during the discussion, the teacher links speakers' contributions to each other, but *does not show* how ideas/positions relate to each other (for example, implicitly building on ideas; or noting that ideas or strategies are different but not describing how). The teacher may revoice or recap, *but does not describe* how ideas or positions relate to each other, or makes only one strong effort to connect speakers' contributions to each other (one strong link).
1	Teacher does not make any effort to link or revoice speakers' contributions.
0	No class discussion, or class discussion is not related to mathematics.

Figure 4.1: IQA *Teacher's Linking Rubric*

IQA Teachers' Press Rubric	
4	The teacher consistently (almost always) asks students to provide evidence for their contributions (i.e., press for conceptual explanations) or to explain their reasoning. (There are few, if any instances of missed press, where the teacher needed to press and did not.)
3	At least twice during the lesson the teacher asks students to provide evidence for their contributions (i.e., press for conceptual explanations) or to explain their reasoning. (The teacher sometimes presses for explanations, but there are instances of missed press.)
2	Most of the press is for computational or procedural explanations or memorized knowledge OR there are one or more superficial, trivial efforts, or formulaic efforts to ask students to provide evidence for their contributions or to explain their reasoning (i.e., asking everyone, "How did you get that?").
1	There are no efforts to ask students to provide evidence for their contributions AND there are no efforts to ask students to explain their thinking.
0	No class discussion OR class discussion was not related to mathematics.

Figure 4.2: IQA *Teacher's Press Rubric*

Source: Boston, Candela, & Dixon 2019, p. 82-83 [adapted from Boston, 2017].



"Decimals on a Number Line" Lesson Transcript

Teacher: Here in our small group we are going to focus on decimals with a number line diagram. I would like you start by drawing a number line on your wipe boards. This is a number line between 0 and 1. What I would like you to do is to estimate the location of seven-tenths. Estimate the location of seven-tenths *[Students estimate location]*

Teacher: So I am going to pull this out so we can talk about it. I see that you wrote zero and one and you started to make the seventh hash tag here

Joseph: but they were very small (he has 7 very small hash marks on his number line)

Teacher: okay what do you mean by that?

Joseph: Cuz that's very small and the one is all the way over here and the seven-tenths should be right here (points to a place closer to 1)

Teacher: Why does he think the seven-tenths should be there Cesar?

Cesar: Because the seven-tenths should be closer to one than closer to zero.

Teacher: Why does he say that Lina?

Lina: Because seven-tenths is greater than five-tenths

Teacher: Thank you. You can erase your boards. With this task I would like you to locate and label a decimal between one and seven-tenths and one and nine-tenths. *[The students work on their whiteboards]*

Teacher: So now that each of you has had the opportunity to finish. Let's look at each of yours and talk about what's the same and what's different. Joseph?

Joseph: What's different from mine and Lina's is that she didn't write the 0 to 2, she did the one and seven-tenths and one and nine-tenths and it would be half for one and eight-tenths.

Teacher: Hmm, what did he say?

Abby: He said for part of the number line she took part of it, so if I erased all of this, this is what she would have.

Teacher: Okay you found different ways to show us one and eight-tenths and actually you are all correct. I am going to give you another one so go ahead and erase your boards. Now what I would like you to do is to locate and label a decimal between .3 and .4 on the number line. *[The students work on their whiteboards.]*

Teacher: So Lina, I see that you have made a mark between three-tenths and four-tenths and now you've paused. What are you thinking?

Lina: I don't know what to put between there. There is no number between it.

Teacher: There's no number you can find between three-tenths and four-tenths? Joseph what do you think about that?
Joseph: It was confusing with me too but then I thought it could be zero and three and one half.

Teacher: zero and three and one-half what?

Joseph: Tenths

Teacher: Abby Do you agree with that?

Abby: I don't really know. I thought that um zero and three tenths would be zero and pretty much three-tenths would be thirty.

Teacher: thirty what?

Abby: thirty tenths

Teacher: 30 tenths?

Abby: Like thirty-five so zero point thirty five hundredths.

Teacher: Wait you said tenths and then you said hundredths.

Abby: I said tenths and then I said hundredths. I don't know.

Teacher: Which one is correct?

Abby: That's the thing, I don't know yet, that's why I was stuck.

Teacher: Cesar

Cesar: Um she put zero point thirty five hundredths because three-tenths is equal to thirty-hundredths

Teacher: Stop for a moment. What did he say? Is he correct?

Abby: I don't know. I'm still stuck. I don't understand both of us are kind of at the same point. We both understand, we are saying the same thing, it's just like we don't know if it's a tenth or a hundredth.

Teacher: Lina where are we now?

Lina: I think that zero and three-tenths is equivalent to zero and thirty hundredths.

Teacher: Joseph you look like you want to jump in.

Joseph: Yes she is actually correct because zero and three tenths would be thirty.

Teacher: Thirty what?

Joseph: Thirty hundredths and then in the middle of zero and three tenths and zero and four tenths would be thirty five hundredths because you are telling us to label one between zero and three tenths and zero and fourth tenths

Teacher: Got it. Nice working making sense of tenths and hundredths on an open number line.