Is 529 a Square Number?*

Below is an episode from a lesson in the Y6 class of Ms Chambers.

Ms Chambers asks the students to work on the following problem:

Is 529 a square number?

One of the students, **Neil**, complains that this is a very large number and that it would take very long to check the squares of all the numbers that are smaller than it. Ms Chambers invites views from the class on Neil's complaint. Anna raises her hand and Ms Chambers invites her to speak.

Anna: I don't think this needs to take as long as Neil thinks: 529 is less than 625 which is the square of 25. So, all we need to check are the squares of 1, 2, 3, 4, 5…. all the way to 24.

Another student, Barack, then asks permission to speak.

Barack: Not even all of the numbers up to 24! Look, 529 ends in 9 and the only squares that end in 9 are the squares of numbers ending in 3 or 7. Like 3 squared is 9, 7 squared is 49, 13 squared is 169 etc. So, of all the numbers that are less than 24, we only need to check the squares of 3, 7, 13, 17, and 23 and we are done!

A third student, Clive, waves his hand impatiently. Ms Chambers signals to him that he can speak.

Clive: What a waste of time! 5 is not a square number, 29 is not a square number. So, 529 is not a square number! Problem solved!

'Thank you, all', says Ms Chambers, 'Quite a few ideas! Shall we take them one by one?'

Imagine you are the teacher of this class.

1. Solve the mathematical problem in the above episode. Justify your answer.
2. How would you respond to Anna?
3. How would you respond to Barack?
4. How would you respond to Clive?
5. How would you conclude the lesson in a way that provides a satisfactory response to the mathematical problem and appease Neil's exasperated comment?

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* Based on activities and examination questions designed by Elena Nardi (e.nardi@uea.ac.uk) for use in UEA's BA Education Year 3 module *Children, teachers and mathematics: Changing public discourses about mathematics* between 2012 and 2016.