PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

One indicator of how well a student understands difficult addition facts is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, and teachers can use the following problem and sample responses to evaluate understanding.

Directions for the Student:
1) Solve the following problem and explain your work and answer.
2) Compare your work to the sample responses in order to determine if your work indicates deep, partial, or beginning understanding.

Problem:
   Trey had 5 yellow pencils and 9 red pencils. How many pencils did he have in all?

Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "I knew that 10 and 5 is 15, so 9 and 5 is 1 less or 14."	This student is using a known fact, 10 + 5 = 15 to help. Since 9 is 1 less than 10, 9 + 5 is 1 less than 10 + 5. One less than 15 is 14. This thinking marks significant progress in thinking about addition that will enable the student to easily solve many problems mentally with larger numbers.
	Student 2: "Nine and 1 more is 10. That leaves 4 more to add, so it's 14."	This student is starting at 9 and making 10, because it is easy to add on from 10. The student took 1 from the 5 and added it to the 9 to make 10. That left 4 from the 5 to add to the 10. This strategy is also one that works well with many problems involving larger numbers.

MakingSense

Level of Understanding	Sample Student Response	Comments
Partial Understanding	**Student 3:** "Start with 5, then count on 9 more—6, 7, 8, 9, 10, 11, 12, 13, 14." This student used fingers to keep track of how many extras had been counted.	This student is using a count-on strategy, but starting with the smaller number. This student is counting on 9 more from the 5. Since there are so many to count on, the student needs to use fingers to keep track of how many extras have been counted.
	Student 4: "I counted on 5 more from 9. 10, 11, 12, 13, 14." This student also used fingers to keep track of how many extras had been counted.	This student is counting on but from the larger number. Since it is difficult to count on 5 more, the student does use fingers to keep track of how many extras are counted.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** "I counted 5, then I counted 9, put them together and counted them all. I got 14."	Although this student did get the correct answer, counting all is not an efficient way to add larger numbers. In order to be able to make sense of addition with larger numbers, this student needs to begin to make sense of counting on, then use known facts to help with unknown facts. Without learning those more efficient strategies, the student will struggle with addition of larger numbers.
	Student 6: "I guessed 13."	Guessing is not an acceptable response to the basic facts. That response is an indicator that the student may have given up trying to make sense of addition and is just trying to get any answer so the task can be put away.