**Main Problem #4**

Topic: *Multiplying Fractions by Whole Numbers*

Problem: Your friend Rashad is an amazing pianist who develops instrumental music for the top R&B singers in the world. This year, he is developing a music for an studio album and he would like to hear your opinion. He gave you one of his music sheets and you notice that there are 4 *crescendos,* 5 *decrescendos,* and 8 *diminuendos.*

Q1. What fraction of the music sheet consists of crescendos? Decrescendos? Diminuendos?

Q2. Rashad tells you that 7 music sheets equals a song. Assuming all sheets have the same number of crescendos, decrescendos, and diminuendos, what fraction of a song consists of crescendos? Decrescendos? Diminuendos?

Q3. Rashad is able to make 4 songs every 9 months. How many songs can he make in 2 years?

*Note: A fraction of a song is not considered a song.*

A1. The number of “endos” or gradual changes in one music sheet is 17 since 4+5+8=17. Therefore, crescendos make up of one sheet, decrescendos make up and diminuendos make up

“Confusion helps students grow and learn, even if they stumble.

A2. This question is actually a trick question since it tests a student’s math literacy and reasoning. The answer to this question is actually the same as the first question. If you think about it, all sheets have the same number of a particular “endo”, therefore, for a certain “endo”, that “endo” makes up the same fraction for all sheets like the first one.

To get a better understand: Crescendos make up of the first sheet. Since we assumed that all sheets have the same number of “endos”, the second, third, fourth, fifth, sixth, and seventh sheets are alsocrescendos.

If you were to multiply by 7, you would get (or ) which doesn’t make sense since the value of this product is greater than 1 (or 100%). This would mean that crescendos make up more than 100% of a song.

The right way to think about this is to look at the units of each fraction. translates to 4 crescendos in one sheet out of 17 “endos” in that one sheet; . You would actually have to multiply this amount by (or 1) to understand why the answer is this way.

A3. This question is solvable even if students have yet to review rates. They should think about how many songs Rashad makes in a month, which is . Since 2 years equals 24 months, we can model this expression and obtain . Since a song must be represented as “whole”, Rashad can make 10 songs every 2 years; we ignore the fraction.