PSC 1121 Celebration of Knowledge 1 Fall 2002 / Dr. Saul

Problem 4 (10 points)

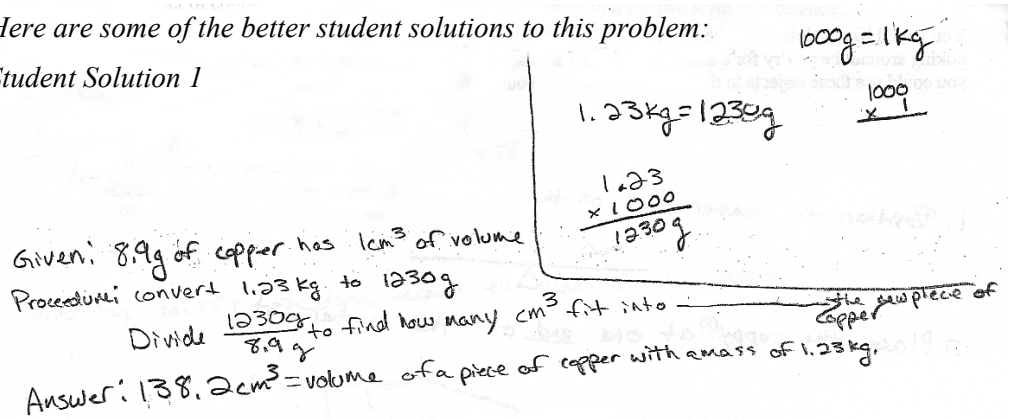
One cubic centimeter of copper has a mass of 8.9 g.
What is the volume of a piece of copper with a mass of 1.23 kg.? Explain your reasoning
For full credit, do not use algebra.

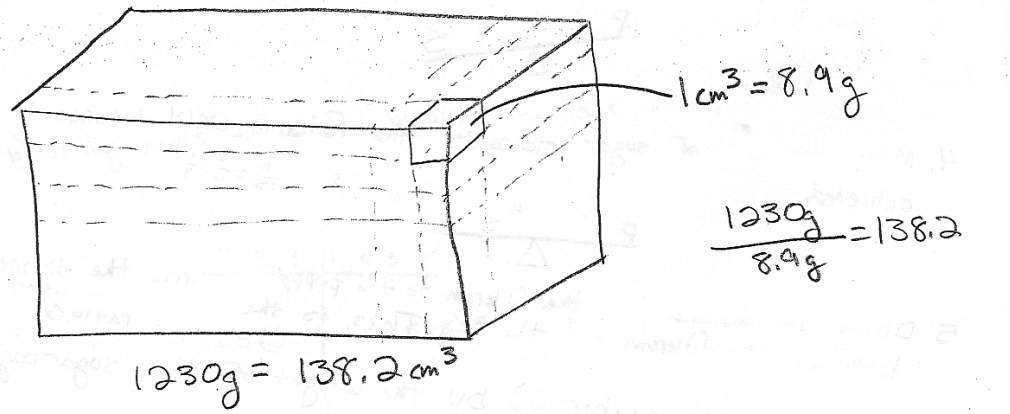
Dr. Saul's comments: The key to this problem is not finding the answer but understanding the process to get the answer. Here we find the volume of the piece with a mass of 1.23 kg by finding out how many 8.9 g pieces of copper it takes to make 1.23 kg and then multiplying by 1 cm^3 per piece. Make sure that unit conversions like going from kg to g are explicit, i.e. show them. One way to do this is like this:

1.23 kg x 1000 g / kg = 1230 g (if you clearly showed how you went from kg to g and lost points, come show me to get those points back.)

Here are some of the better student solutions to this problem:

Student Solution 1

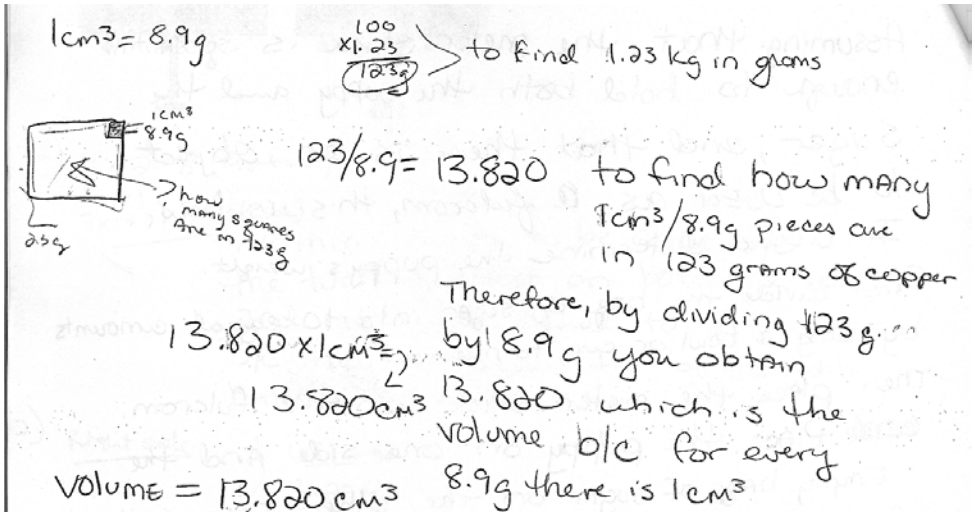




This is a pretty good solution but it could be improved if the reasoning behind the division step was clearer. (Technically if you want to do the calculation in one step you would have to divide 1,230 g by 8.9 g/cm^3.) Also, since the density only has 2 significant figures, your answer should also only have 2 significant figures.
So V = 140 *cm^3*

Problem 4 (cont.)

Student Solution 2



Note that the reasoning in solution 2 above and solution 3 below in the division step is clearer.

Student solution 3: