Limiting Reactant Problems

In my kitchen: 10 kg of flour, 10 kg of sugar, big tub of butter, 2 dozen eggs, 1 cup of chocolate chips

Recipe says use: 2 ¼ cups flour, 2 cups sugar, 1 cup butter, 2 eggs, 1 cup chocolate chips

Which ingredient will limit the amount of cookies I can bake?

What word can be used to describe the quantity of the other ingredients?

Limiting reactant problems are just like the problem above except instead of a recipe they use a balanced chemical equation.

If 20.0 g of H_2 reacts with 100.0g of O_2 to produce H_2O, which reactant is in excess and by how many grams?

1. Write a balanced equation

2. To determine the excess reactant, calculate the mass of one product. (For this reaction there is only one product, but for other reactions there may be more than one. You can pick any one unless the question asks for a specific product.) In other words, start with both reactants and calculate how much product can be produced from that reactant, if the other reactant is excess.

3. The smaller mass of product will be the mass that can actually be produced.

4. The reactant that makes the smaller or actual amount of product is called the LIMITING REACTANT because it limits the amount of product that can be produced. Identify the limiting reactant in this problem.

5. The other reactant is known as the EXCESS reactant.

6. To determine the excess mass, find out how much of the excess reactant will actually be used. Then subtract that amount from the starting amount.

Try this one:
56.8g $FeCl_2$, 14.0g KNO_3, and 40.0g HCl are mixed and react according to the following

$$3\ FeCl_2 + KNO_3 + 4\ HCl \rightarrow 3\ FeCl_3 + NO + 2\ H_2O + KCl$$

Name the limiting reactant.
How many grams of each excess reactant are present?