Solve the following equations using your knowledge of molar ratios. Start by balancing the equations for each of the problems. (Double check your answers with Mr. Markon before starting the calculations)

Propane (C3H8) burns in this reaction:

$C_3H_8 + 5\ O_2$ ----> $4\ H_2O + 3\ CO_2$

1. If 200. g of propane is burned, how many g of H2O is produced?

$$200\ g\ C_3H_8 \times \frac{1\ mol\ C_3H_8}{44.01\ g\ C_3H_8} \times \frac{4\ mol\ H_2O}{1\ mol C_3H_8} \times \frac{18.01\ g\ H_2O}{1\ mol\ H_2O} = 327\ g\ H_2O$$

2. If ammonia, NH3, is burned in air, the following reaction takes place:

$4\ NH_3 + 3\ O_2 \longrightarrow 2\ N_2 + 6\ H_2O$

Given that you started with 51.0 g of NH_3, how many g of water will be produced?

$$51.0\ g\ NH_3 \times \frac{1\ mol\ NH_3}{17.03\ g\ NH_3} \times \frac{6\ mol\ H_2O}{4\ mol\ NH_3} \times \frac{18.01\ g\ H_2O}{1\ mol\ H_2O} = 80.9\ g\ H_2O$$

3. Using the following equation:

$2\ NaOH + H_2SO_4$ ---> $2\ H_2O + Na_2SO_4$

How many grams of sodium sulfate will be formed if you start with 200. grams of sodium hydroxide and you have an excess of sulfuric acid?

$$200\ g\ NaOH \times \frac{1\ mol\ NaOH}{40.00\ NaOH} \times \frac{1\ mol\ Na_2SO_4}{2\ mol\ NaOH} \times \frac{142.04\ g\ Na_2SO_4}{1\ mol\ Na_2SO_4} = 355\ g\ Na_2SO_4$$

4. Using the following equation:

$Pb(SO_4)_2 + 4\ LiNO_3$ ----> $Pb(NO_3)_4 + 2\ Li_2SO_4$

How many grams of lithium nitrate will be needed to make 250. grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?

$$250\ g\ Li_2SO_4 \times \frac{1\ mol\ \ Li_2SO_4}{109.94\ g\ Li_2SO_4} \times \frac{4\ mol\ \ Li\ \ NO_3}{2\ mol\ Li_2SO_4} \times \frac{68.95\ g\ \ LiNO_3}{1\ mol\ Li\ \ NO_3} = 314\ g\ LiNO_3$$