Perfect answers to #8 and #4 from the "Homework #2", which has a picture of my mom…

8. Determine the mass of water vapor you would expect to form (and the percent yield) in the reaction between 15.8 g of NH_3 and excess oxygen to produce water and nitric oxide (NO). The mass of water actually formed is 21.8 g.

Equation:	4 $NH_{3(g)}$	+ 5 $O_{2(g)}$ →	6 $H_2O_{(g)}$	+ 4 $NO_{(g)}$
Before	0.928	xs	0	0
Change	-0.928		+1.39	
After	0		1.39	

$$15.8\ g\ NH_3 \times \frac{1\ mol\ NH_3}{17.0\ g\ NH_3} = 0.928\ mol\ NH_3 \times \frac{6\ mol\ H_2O}{4\ mol\ NH_3} = 1.39\ mol\ H_2O \times \frac{18.0\ g\ H_2O}{1\ mol\ H_2O} = 25.1\ g\ H_2O$$

$$\frac{21.8\ g\ H_2O}{25.1\ g\ H_2O} \times 100\% = 86.9\ \%\ yield$$

4. Suppose 4.61 g of zinc was allowed to react with hydrochloric acid to produce zinc chloride and hydrogen gas. How much zinc chloride should you get? Suppose that you actually recovered 8.56 g of zinc chloride. What is your percent yield? From here on, moles are understood in the BCA table.

Equation:	1 $Zn_{(s)}$	+ 2 $HCl_{(aq)}$ →	1 $ZnCl_{2(aq)}$	+	1 $H_{2\ (g)}$
Before	0.0705	xs	0		0
Change	-0.0705		+0.0705		
After	0		0.0705		

$$4.61\ g\ Zn \times \frac{1\ mol\ Zn}{65.4\ g\ Zn} = 0.0705\ mol\ Zn \times \frac{1\ mol\ ZnCl_2}{1\ mol\ Zn} = 0.0705\ mol\ ZnCl_2 \times \frac{136.3\ g\ ZnCl_2}{1\ mol\ ZnCl_2} = 9.61\ g\ ZnCl_2$$

$$\frac{8.56\ g\ ZnCl_2\ \text{actual}}{9.61\ g\ ZnCl_2\ \text{theoretical}} \times 100\% = 89.1\%\ yield$$