Example of Work for Determining Theor/stioch. yield & Percent yield

Water, H_2O, can be made in the synthesis reaction,

$$2H_{2(g)} + 1O_{2(g)} \rightarrow 2H_2O_{(g)}$$

I reacted 4.52g of elemental hydrogen gas (with enough O_2 so that all of the H_2 reacted) and experimentally determined that I obtained 31.8 g H_2O. Determine theoretical yield of H_2O and percent yield.
(stiochiometric)

$mmH_2 = 2(1g) = \frac{2g\ H_2}{1\ mol\ H_2}$

$mmH_2O = 2(1g) + 1(16g) = \frac{18g\ H_2O}{1\ mol\ H_2O}$

Theoretical/stoichiometric yield H_2O

$$\left(4.52g\ H_2\right)\left(\frac{1\ mol\ H_2}{2g\ H_2}\right)\left(\frac{2\ mol\ H_2O}{2\ mol\ H_2}\right)\left(\frac{18g\ H_2O}{1\ mol\ H_2O}\right) = 40.68g\ H_2O$$

$\boxed{40.7g\ H_2O \text{ theor. yield}}$

$$\%\ yield = \frac{\text{actual/expt yield}}{\text{theor/stoichiometric yield}} \cdot 100\%$$

$$= \frac{31.8g\ H_2O}{40.68g\ H_2O} \cdot 100\% = 78.17\%$$

$$= \boxed{78.2\%}$$