Hess's Law Worksheet Name: _____

1. Calculate ΔH for the reaction $4\ NH_3\ (g) + 5\ O_2\ (g) \rightarrow 4\ NO\ (g) + 6\ H_2O\ (g)$, from the following data.

$N_2\ (g) + O_2\ (g) \rightarrow 2\ NO\ (g)$	$\Delta H = -180.5$ kJ
$N_2\ (g) + 3\ H_2\ (g) \rightarrow 2\ NH_3\ (g)$	$\Delta H = -91.8$ kJ
$2\ H_2\ (g) + O_2\ (g) \rightarrow 2\ H_2O\ (g)$	$\Delta H = -483.6$ kJ

2. Find ΔH° for the reaction $2H_2(g) + 2C(s) + O_2(g) \rightarrow C_2H_5OH(l)$, using the following thermochemical data.

$C_2H_5OH\ (l) + 2\ O_2\ (g) \rightarrow 2\ CO_2\ (g) + 2\ H_2O\ (l)$	$\Delta H = -875$ kJ
$C\ (s) + O_2\ (g) \rightarrow CO_2\ (g)$	$\Delta H = -394.51$ kJ
$H_2\ (g) + ½\ O_2\ (g) \rightarrow H_2O\ (l)$	$\Delta H = -285.8$ kJ

3. Calculate ΔH for the reaction $CH_4\ (g) + NH_3\ (g) \rightarrow HCN\ (g) + 3\ H_2\ (g)$, given:

$N_2\ (g) + 3\ H_2\ (g) \rightarrow 2\ NH_3\ (g)$	$\Delta H = -91.8$ kJ
$C\ (s) + 2\ H_2\ (g) \rightarrow CH_4\ (g)$	$\Delta H = -74.9$ kJ
$H_2\ (g) + 2\ C\ (s) + N_2\ (g) \rightarrow 2\ HCN\ (g)$	$\Delta H = +270.3$ kJ