A gas is compressed to a volume of 3.0 m^3, under a pressure of 15 atm at a temperature of 20° C. Assume T remains constant. What volume will the gas occupy when it is allowed to expand to 1 atm?

PV = NkT, but N and k are constants, and we are told T is constant, too

$(PV)_{initial} = (PV)_{final}$

$(15\ atm * 3.0\ m^3) = (1\ atm * V_{final})$

Vfinal = 45 m^3

The temperature of a gas in a glass container is increased from 300 K to 600 K. How will the pressure inside the container change?

Again, PV = NkT, where N, k, and V are constant. Rearrange to get all constants on the same side:

T/P = V/Nk = constant

$(T/P)_{initial} = (T/P)_{final}$

$(300K / P_{initial}) = (600K / P_{final})$

$P_{final} = (600 / 300) P_{initial}$, or $2 P_{initial}$