Pressure in a cylinder following combustion

Assuming that combustion has taken place the number of moles increases by a factor of 1.36. Including the N_2, the number of moles is 0.0011 and the temperature is 1200 K. What is the pressure inside the piston (assume the volume is constant at the initial V = 0.02 L)?

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Solution: use the ideal gas law solving for pressure.

$$P = \frac{nRT}{V} = \frac{(0.0011\ mol)\left(0.08206\ \frac{Latm}{molK}\right)(1200\ K)}{0.02\ L}$$

$$P = 5.41\ atm$$