P #36

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$T = 20^\circ C + 273$

$= 293\ K$

$V = (.2\ m)(.2\ m)(.2\ m)$

$= .008\ m^3$

$n = 3\ mol$

Find P:

$P \cdot V = n \cdot R \cdot T$

$(P)(.008\ m^3) = (3)(8.31\ J/mol\ K)(293\ K)$

$P = 913{,}061\ Pa$

Find F:

$P = \frac{F}{A}$ $\qquad (913{,}061\ Pa) = \frac{F}{(.2\ m)(.2\ m)}$

$F = 36{,}500\ N$