[tex35] **Ideal gas heat capacity by design**

Consider 1mol of a classical ideal gas [$pV = RT, C_V = \frac{3}{2}R$].

(a) If C_X is the heat capacity of a reversible process in which the thermodynamic variable X is kept constant, show that this process is described by a curve $pV^f =$ const in the (p, V)-plane with $f = (C_p - C_X)/(C_X - C_V)$.

(b) Discuss the result for three special cases: $X = p,\ X = V,\ X = S$.