Fluids:

Statics

\[ P = \frac{F}{A}, \text{and} \quad \rho = \frac{m}{V} \]

\[ P = P_{\text{air}} + \rho gh. \]

\[ P = P_{\text{air}} + P_{\text{gauge}}. \]

Buoyant Force

\[ F_B = \rho V_{\text{disp}} g \]

Dynamics

Equation of Continuity

\[ \frac{\Delta m}{\Delta t} = \rho A v \]

\[ A_1 v_1 = A_2 v_2. \]

Bernoulli's Equation

\[ P_1 + \frac{1}{2} \rho v_1^2 + \rho g y_1 = P_2 + \frac{1}{2} \rho v_2^2 + \rho g y_2. \]

Ideal Gas Law

\[ PV = NkT = nRT \]

\[ N_A k = R \]

Specific Heat and Heat Capacities:

\[ Q = mc\Delta T = C\Delta T, \]

\[ \sum Q_i = 0, \quad \text{closed system (e.g. calorimeter).} \]

Heat Conduction:

\[ \frac{Q}{t} = \kappa A \frac{\Delta T}{\Delta x} \]

Thermal Expansion

\[ \Delta L = L_o \alpha \Delta T \]

\[ \Delta V = V_o \beta \Delta T \]

Radiation—all blackbodies of temperature \( T \)

\[ \frac{Q}{t} = \sigma A T^4 \]

Phase changes

\[ Q = mL \]