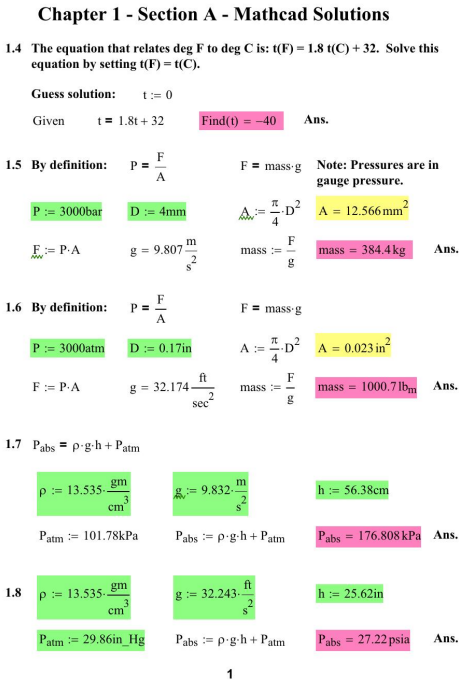
Engineering Chemical Thermodynamics Koretsky Solution



Chapter 1 - Section A - Mathcad Solutions

1.4 **The equation that relates deg F to deg C is: t(F) = 1.8 t(C) + 32. Solve this equation by setting t(F) = t(C).**

Guess solution: $t := 0$

Given $t = 1.8t + 32$ $\text{Find}(t) = -40$ **Ans.**

1.5 **By definition:** $P = \frac{F}{A}$ $F = \text{mass} \cdot g$ **Note: Pressures are in gauge pressure.**

$P := 3000\text{bar}$ $D := 4\text{mm}$ $A := \frac{\pi}{4} \cdot D^2$ $A = 12.566\,\text{mm}^2$

$F := P \cdot A$ $g = 9.807\,\frac{\text{m}}{\text{s}^2}$ $\text{mass} := \frac{F}{g}$ $\text{mass} = 384.4\,\text{kg}$ **Ans.**

1.6 **By definition:** $P = \frac{F}{A}$ $F = \text{mass} \cdot g$

$P := 3000\text{atm}$ $D := 0.17\text{in}$ $A := \frac{\pi}{4} D^2$ $A = 0.023\,\text{in}^2$

$F := P \cdot A$ $g = 32.174\,\frac{\text{ft}}{\text{sec}^2}$ $\text{mass} := \frac{F}{g}$ $\text{mass} = 1000.7\,\text{lb}_\text{m}$ **Ans.**

1.7 $P_{abs} = \rho \cdot g \cdot h + P_{atm}$

$\rho := 13.535 \cdot \frac{\text{gm}}{\text{cm}^3}$ $g := 9.832 \cdot \frac{\text{m}}{\text{s}^2}$ $h := 56.38\text{cm}$

$P_{atm} := 101.78\text{kPa}$ $P_{abs} := \rho \cdot g \cdot h + P_{atm}$ $P_{abs} = 176.808\,\text{kPa}$ **Ans.**

1.8 $\rho := 13.535 \cdot \frac{\text{gm}}{\text{cm}^3}$ $g := 32.243 \cdot \frac{\text{ft}}{\text{s}^2}$ $h := 25.62\text{in}$

$P_{atm} := 29.86\text{in\_Hg}$ $P_{abs} := \rho \cdot g \cdot h + P_{atm}$ $P_{abs} = 27.22\,\text{psia}$ **Ans.**

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