Chapter 1  
Homework Handout

1. Given that the concentration flowing into a reactor is \( C_{i0} = 3.5 \text{ mole/liter} \) and the volumetric flow rate is \( v_0 = 25 \text{ gal/min} \), what is the molar flow rate in \( \text{ mole/s} \)?

\[
F_{i0} = C_{i0} v_0 \frac{\text{mole}}{\text{liter}} \frac{\text{liter}}{\text{min}} \frac{1000 \text{ liter}}{60 \text{ s}} \frac{1 \text{ gal}}{264.17 \text{ gal}} \\
\]

\[
5.52044 \text{ mole/s} \\
\]

2. The following data is available for a CSTR. Calculate the volume of the reactor in liters.

\[
F_{A0} = 0.25 \text{ mole/min}; \quad F_A = 0.025 \text{ mole/min}; \quad -r_A = 0.001 \text{ mole/liter min} \\
F_{A0} = 0.25 \text{ mole/min}; \quad F_A = 0.025 \text{ mole/min}; \quad r_A = 0.001 \text{ mole/liter min} \\
V_{CSTR} = \frac{F_{A0} - F_A}{r_A} \\
\]

\[
225. \text{ liter} \\
\]