Problem 1

The opamp in this circuit is a Buffer

\[ V_+ = V_- = V_0 \]

Note that \( V_0 = V_x \)

Note that \( V_y = V_0 + 2.5 \)

The voltage across \( R \) is \( 2.5 \text{V} \)

\[ I = \frac{V_y - V_x}{2.5 \text{m}} = \frac{2.5 \text{V}}{2.5 \text{m}} = 1 \text{mA} \]

\[ I_L = 1 \text{mA} \]
We have

Recognizing the ZR amp is a buffer.

Problem 4
First find $V_y$

From summing amp

$$V_y = V_B + V_x - V_A$$

$$I = \frac{V_y - V_x}{R} = \frac{(V_B + V_x - V_A) - V_x}{R}$$

$$= \frac{V_B - V_A}{R} = \frac{V_{in}}{R}$$

$$= 0$$

$$I_L = \frac{V_{in}}{R}$$
\[ V_0 = V_{o1} - V_{o2} \]

\[ V_{o1} = V_{in}(11) \]

\[ V_{o2} = V_{o1}(-1) = -V_{o1} = -11V_{in} \]

\[ V_0 = V_{o1} - V_{o2} = 11V_{in} - (-11V_{in}) = 22V_{in} \]

\[ -D \left( \frac{V_0}{V_{in}} \right) = 22 \]