

Chapter 5, Solution 87.

The output, v_a , of the first op amp is,

$$v_a = (1 + (R_2/R_1))v_1 \quad (1)$$

Also,
$$v_o = (-R_4/R_3)v_a + (1 + (R_4/R_3))v_2 \quad (2)$$

Substituting (1) into (2),

$$v_o = (-R_4/R_3)(1 + (R_2/R_1))v_1 + (1 + (R_4/R_3))v_2$$

Or,
$$v_o = (1 + (R_4/R_3))v_2 - (R_4/R_3 + (R_2R_4/R_1R_3))v_1$$

If $R_4 = R_1$ and $R_3 = R_2$, then,

$$v_o = (1 + (R_4/R_3))(v_2 - v_1)$$

which is a subtractor with a gain of $(1 + (R_4/R_3))$.