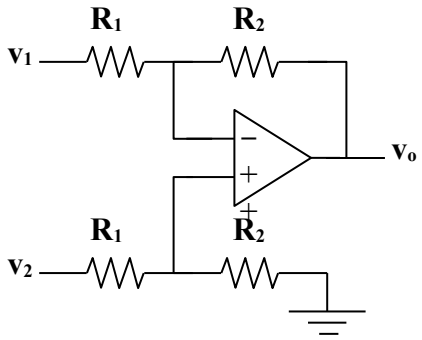
Chapter 5, Solution 50.

(a) We use a difference amplifier, as shown below:



$$v_o = \frac{R_2}{R_1}(v_2 - v_1) = 2.5(v_2 - v_1), \text{ i.e. } R_2/R_1 = 2.5$$

If $R_1 =$ **100 kΩ** then $R_2 =$ **250kΩ**

(b) We may apply the idea in Prob. 5.35.

$$\begin{aligned} v_0 &= 2.5v_1 - 2.5v_2 \\ &= -\left[\frac{R}{R/2}(-v_1) + \frac{R}{R/2}v_2\right] \\ &= -\left[\frac{R_f}{R_1}(-v_1) + \frac{R_f}{R_2}v_2\right] \end{aligned}$$

i.e. $R_f = R$, $R_1 = R/2.5 = R_2$

We need an inverter to invert v_1 and a summer, as shown below. We may let R = 100 kΩ.