45. (a) The current in the galvanometer should be 1.62 mA when the potential difference across the resistor-galvanometer combination is 1.00 V. The potential difference across the galvanometer alone is $iR_g = (1.62 \times 10^{-3}\,\text{A})(75.3\,\Omega) = 0.122\,\text{V}$, so the resistor must be in series with the galvanometer and the potential difference across it must be $1.00\,\text{V} - 0.122\,\text{V} = 0.878\text{V}$. The resistance should be $R = (0.878\,\text{V})/(1.62 \times 10^{-3}\,\text{A}) = 542\,\Omega$.

(b) The current in the galvanometer should be 1.62 mA when the total current in the resistor and galvanometer combination is 50.0 mA. The resistor should be in parallel with the galvanometer, and the current through it should be $50.0\,\text{mA} - 1.62\,\text{mA} = 48.38\,\text{mA}$. The potential difference across the resistor is the same as that across the galvanometer, 0.122 V, so the resistance should be $R = (0.122\,\text{V})/(48.38 \times 10^{-3}\,\text{A}) = 2.52\ \Omega$.