	Marks
• Will AgCl precipitate if solutions of 25.0 mL of 2.0×10^{-5} M KCl and 75.0 mL of 1×10^{-5} M AgNO$_3$ are added to one another? Show your reasoning. K_{sp} for AgCl = 1.8×10^{-10} at 25 °C.	**2**

After mixing the solution has a volume of (25.0 + 75.0) mL = 100.0 mL. Using $c_1V_1 = c_2V_2$, this leads to Ag$^+$ and Cl$^-$ concentrations of:

$$[Ag^+(aq)] = (75.0 / 100.0) \times 1 \times 10^{-5} \text{ M} = 7.5 \times 10^{-6} \text{ M}$$

$$[Cl^-(aq)] = (25.0 / 100.0) \times 2.0 \times 10^{-5} \text{ M} = 5 \times 10^{-5} \text{ M}$$

AgCl(s) dissolves to give Ag$^+$(aq) + Cl$^-$(aq) with the ionic product, Q_{sp}:

$$Q_{sp} = [Ag^+(aq)][Cl^-(aq)] = (7.5 \times 10^{-6}) \times (5 \times 10^{-5}) = 4 \times 10^{-11}$$

As $Q_{sp} \ll K_{sp}$, there will be no precipitate.

	Answer: **No precipitate forms**