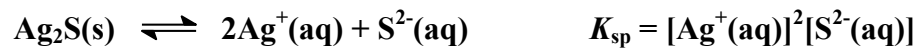


- Calculate the molar solubility of silver sulfide,  $\text{Ag}_2\text{S}$ , given that  $K_{\text{sp}}$  is  $8 \times 10^{-51}$  at  $25^\circ\text{C}$ .

**Marks**  
**3**

**The dissolution reaction and solubility product are:**



**If  $x$  mol of  $\text{Ag}_2\text{S}$  dissolve in one litre, then  $[\text{Ag}^+(\text{aq})] = 2x \text{ M}$  and  $[\text{S}^{2-}(\text{aq})] = x \text{ M}$ .  
Hence:**

$$K_{\text{sp}} = (2x)^2(x) = 4x^3 = 8 \times 10^{-51} \quad \text{so } x = 1 \times 10^{-17}$$

Answer:  $1 \times 10^{-17}$